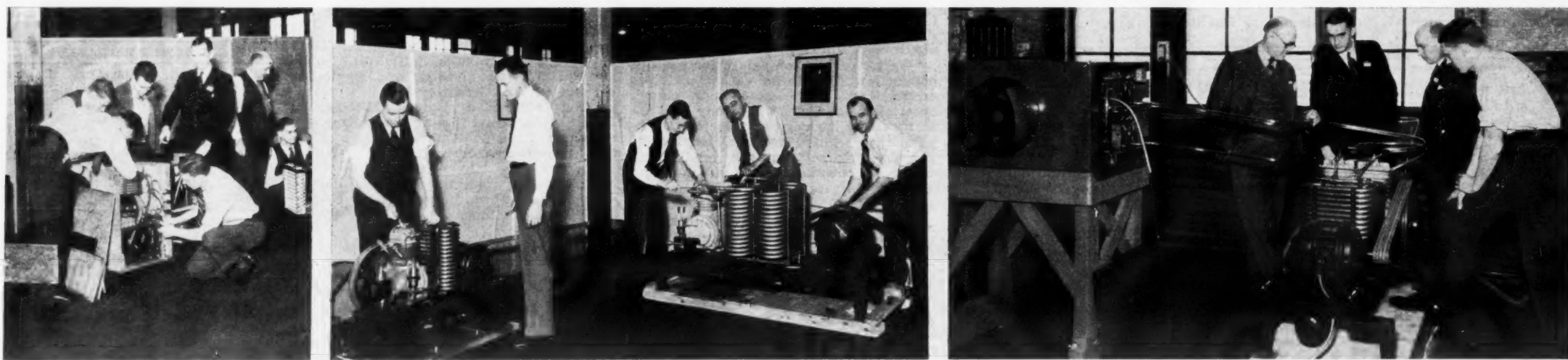
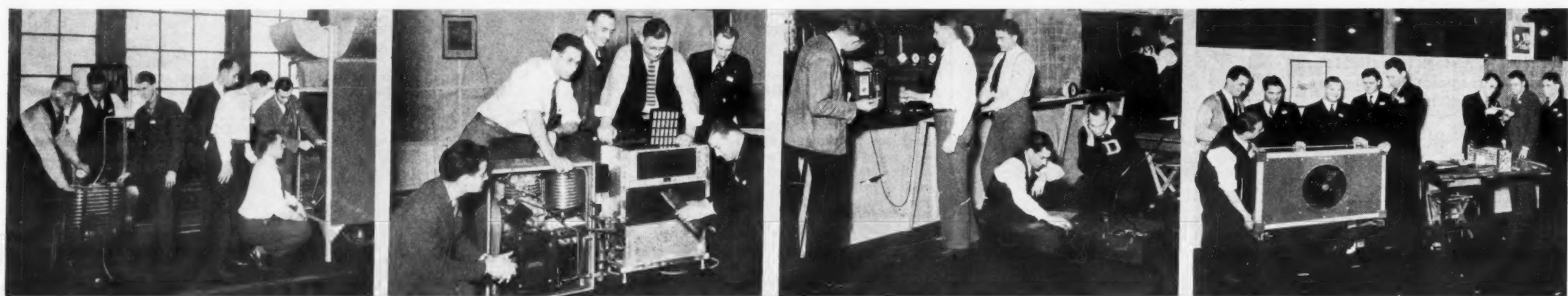


# G-E and Westinghouse Conduct Air-Conditioning Schools

*Engineering Problems Studied in Classes Held at Schenectady and East Pittsburgh*



Scenes during the recent General Electric air-conditioning institute. (1) "students" study room coolers in classroom No. 7, under the direction of G-E air-conditioning officials. (2) Another group at work in classroom No. 6, getting the facts on counter-flow condensing units. (3) Classroom No. 7 again, with a G-E store cooler in operation.



(1) G-E institute students in classroom No. 8, with complete oil-fired, year-round central system on air conditioning in operation. (2) More work with G-E room air conditioners, this time in classroom No. 2. (3) Studying air-conditioning instruments and measurements in classroom No. 3. (4) Classroom No. 9, covering the new unit assembly system of central air conditioning.



(1) Part of the course at Westinghouse's school for dealers' representatives at East Pittsburgh recently was to figure the air-conditioning requirements for Penn Lincoln Hotel and Coffee Shop, headquarters for those who attended. Here are the students, hard at work under the supervision of W. A. Minkler (extreme left) and L. G. Huggins, Westinghouse engineers. (2) In the midst of a snow storm, the students board their special bus from the Penn Lincoln hotel to the Westinghouse plant. (3) Getting down to fundamentals in the classroom.



(1) S. H. Perdue, Cecil Gray, and H. G. Duval, Richmond, Va.; Emil Ehret of the Westinghouse staff and I. C. Minnick, Atlanta, supervisor for the southeast district, watching a demonstration of how water can be made to boil at 50° F. (normal is 212° F.) by reducing pressure. (2) Bob Bonthron, Philadelphia Westinghouse supervisor, tries to curry favor by giving Schoolmaster S. F. Myers an apple. (3) E. F. Beckmeyer of Beckmeyer & Davis Co., Huntington, W. Va., expounds his ideas to F. R. Thompson, J. H. Simpson, Winston-Salem, N. C.; Mr. Bonthron; N. V. Nininger, Roanoke, Va., and his partner, C. W. Davis. (4) Harry Ferguson, Miami, Fla.; Mr. Simpson; and E. F. Oelkers, San Antonio, discuss a suspended-type conditioner.



(1) Mr. Beckmeyer, Mr. Bonthron, Mr. Davis, Mr. Nininger, Mr. Oelkers, Mr. Gray, and E. J. Powell, Scranton, Pa., hard at work. (2) With a cutaway model of a floor-type, Schoolmaster Myers explains some of the inner features of the Westinghouse units. (3) Paul T. Kuhn and John Ingram, Savannah, Ga., Mr. Minnick, Mr. Huggins, R. Wiley Smith, Columbus, Ga., and Walter Green, Wilmington, Del., figuring the air-conditioning requirements for the Penn Lincoln Hotel and Coffee Shop. (4) Mr. Meyers outlines the course of study to engineers at the school.

# REFRIGERATION NEWS

Registered U. S. Patent Office

ESTABLISHED 1926. MEMBER AUDIT BUREAU OF CIRCULATIONS. MEMBER ASSOCIATED BUSINESS PAPERS. MEMBER PERIODICAL PUBLISHERS INSTITUTE.

VOL. 14, No. 9, SERIAL NO. 310  
ISSUED EVERY WEEKEntered as second-class  
matter Aug. 1, 1927

DETROIT, MICHIGAN, FEBRUARY 27, 1935

Copyright, 1935, by  
Business News Pub. Co.THREE DOLLARS PER YEAR  
TEN CENTS PER COPY

## Rating Method For Commercial Units Approved

### Rating Conditions Altered And Machine Capacities Grouped in 4 Classes

DETROIT—Recently made public, the new set of conditions for rating commercial condensing units as proposed by the joint committee of the Refrigeration Division of National Electrical Manufacturers Association, American Society of Refrigerating Engineers, and Refrigerating Machinery Association has been approved by all three associations.

As outlined by W. M. Timmerman, General Electric refrigeration engineer and member of the technical committee of the Nema Refrigeration Division, the new ratings were evolved with regard to the following fundamental considerations:

Since condensing units are designed for operation at various suction temperatures, the standard suction temperature for rating purposes should approximate the design or application temperature. This resolves itself into the employment of several standard suction temperatures.

Standard ton conditions were intended primarily as a rating for the compressor only, but the new method of rating covers the complete condensing unit.

## Fedders Introduces Two New Valves

BUFFALO — Fedders Mfg. Co. has just introduced a new constant pressure valve and a new check valve for refrigeration applications.

The constant pressure valve is employed in single and multiple refrigeration systems where constant pressure is desired for a more uniform temperature condition in the evaporator. It is installed between the outlet of the evaporator and the suction side of the compressor.

Fedders' valve has been constructed so that it can be adjusted, by means of a thumbscrew, to maintain the desired gauge pressure in the low side of the system. It is equipped with a shut-off valve for gauge reading, making it convenient to check the pressure in the evaporator at any time.

The constant pressure valve is constructed with the Fedders cartridge-type needle-seat valve assembly, with (Concluded on Page 20, Column 1)

## Birmingham Utility Co. Leaves Retail Field

BIRMINGHAM, Ala.—Leaving retail sales entirely to independent dealers, Birmingham Electric Co., local utility, has withdrawn from the electric refrigeration sales field.

During the past two years the utility has displayed leading refrigerators on its sales floor and sold them for the account of the respective distributors. Under the new plan the boxes will still be kept in the showroom, but buyers will be directed to the dealers' showrooms. Names of the respective distributors (and their dealers if desired) will be displayed over the different makes of boxes kept on the floor.

While thus not actively selling, the utility has set up a dealer cooperative department and will help dealers train salesmen, hold cooking schools, etc.

The utility acted on the assumption that the refrigerator no longer needs to be pioneered and that existing dealers give plenty of coverage.

The company will now give its attention to the promotion of items which as yet do not have such popular appeal, such as attic ventilation, air conditioning, dishwashers, ranges, and washing machines.

## Second Westinghouse Air-Conditioning School Ends

EAST PITTSBURGH — Westinghouse Electric & Mfg. Co. has completed its second Air Conditioning Application Engineering School here. The school was in session Feb. 18 through Feb. 23.

## Comfort Cooling Installations Gain in Philadelphia, Boston; Lag in New York

Installations of air-conditioning equipment, in point of number made, showed increases of considerable proportions during 1934 in Philadelphia and Boston, but preliminary reports from New York City indicate that total installations in the nation's largest city will fall slightly behind the 1933 figure.

Data covering air-conditioning installations in the three great eastern metropolitan centers have been collected by the power companies in each of the cities.

Most notable advance was made in Philadelphia, where the 1934 total of 149 installations was more than triple the number made in 1933, and nearly

equal to the total number of installations made in all previous years.

Startling is the number of private residences in which systems were installed—37 in all—particularly in view of the fact that the records show that no Philadelphia homes were air conditioned prior to 1934. Other major gains, from the individual classification standpoint, were in offices and schools.

During 1934 the Philadelphia Electric Co. conducted promotional campaigns on air conditioning for industrial plants, stores, restaurants, and other commercial applications, sending out specific and descriptive literature. (Concluded on Page 13, Column 1)

## Frigidaire Will Cool Air in Maytag Hotel

KANSAS CITY—The Kansas City district office of Frigidaire Corp. has closed a contract with F. L. Maytag, president of the Maytag Washing Machine Co., Newton, Iowa, for complete air conditioning of the Maytag hotel in Newton. Mr. Maytag is owner of the hotel.

The building, five stories high and a block long, will be fully air conditioned, including the ballroom, taproom, dining room, apartments, and bedrooms. Cost of the job is estimated at between \$40,000 and \$50,000, and the contract calls for its completion by May 1, in time for summer business.

While several hotels throughout the country are partially air conditioned, the Maytag hotel job is believed to be the first to be equipped with a complete system, according to P. K. Avery, Frigidaire Kansas City district manager.

Refrigeration business to date in the territory has exceeded the 1934 mark, Mr. Avery said, and February billings will exceed last year's peak, reached in May, and best in the company's history. Orders for shipments received from dealers already exceed 22 carloads, he said, indicating earlier buying by the public.

## Detroit Engineers Hear About Frozen Elephant

DETROIT — Dinosaur eggs and Mesozoic fauna may be a far cry from refrigeration, but just the same Prof. R. C. Hussey of the University of Michigan's department of geology made the Detroit section of the American Society of Refrigerating Engineers mightily interested in prehistoric life at the regular meeting of the society Monday night.

Prof. Hussey delivered his oft-repeated lecture, "The Lost World," to some 30 engineers and their wives in the ballroom of the Hotel Statler. Colored lantern slides illustrated his travelogue through the ages of life-before-man.

Refrigeration did enter the story at (Concluded on Page 11, Column 3)

## Court Rules Sale of Power by TVA Is Illegal

BIRMINGHAM, Ala.—Judge W. I. Grubb in United States District Court, Friday, held the Tennessee Valley Authority was without legal authority to dispose of surplus power generated at hydro-electric plants on the Tennessee river, and made permanent an injunction restraining 14 Alabama towns from negotiating loans with the PWA for the purpose of building municipal electric systems.

Judge Grubb's decision was made orally at the completion of arguments of chief TVA Counsel James L. Fly against granting of the injunction. Mr. Fly immediately gave notice of an appeal, which probably will be filed at an early date with United States Court of Appeals in New Orleans.

A group of preferred shareholders brought the suit on which the ruling was made, alleging that plans for an extensive electrification program in northwest Alabama were unconstitutional.

The suit was filed after the Alabama Power Co. had entered a contract to sell to the TVA 14 distribution systems. (Concluded on Page 2, Column 4)

## 11 Distributors Are Named by Gibson

GREENVILLE, Mich. — Appointment of 11 firms as distributors of its 1935 line of Gibson refrigerators was announced last week by Gibson Electric Refrigerator Corp.

New distributors are: Capital Paper Co., Indianapolis; J. L. Perry Co., Nashville, Tenn.; J. J. Koepsel Co., Milwaukee; Motor Parts Co., Philadelphia; Moon Brothers, Detroit; Kendix Co. and F. B. Connelly (subsidiary), with headquarters in Portland, Ore., Seattle, and Billings, Mont.; Wehle Electric Co., Birmingham, N. Y.; Wright & Wilhelm, Omaha, Neb.; Scranton Distributors, Scranton, Pa.; Sterling Electric Co., Minneapolis; and H. M. Tower Corp., Boston.

## Pennsylvania Distributors Draw Largest Crowds To General Electric Spring Dealer Meetings

CLEVELAND—(Special Wire to ELECTRIC REFRIGERATION NEWS)—Largest attendance figures at the series of spring sales conventions being held by General Electric distributors throughout the country are reported by the Ochiltree Electric Co., Pittsburgh, with 504, Keystone Appliances, Inc., Harrisburg, Pa., 630, and Judson C. Burns, Inc., Philadelphia, 508.

Sales promotion managers handling these respective meetings were R. W. Evans, W. C. Jones, and Ray Scholl.

Participating in the convention held by Southern Appliances, Inc., New Orleans distributor, were Ward Stringham, head of the distributorship, Carl Brown, Henry Devaud, and Mrs. Marie Nelson of the distributor's staff. The meeting was attended by approximately 200 dealers and salesmen of Louisiana and Mississippi.

Each of the three G-E convention troupes is carrying a carload of special scenery and properties, including a large amount of lighting equipment.

Members of the staff of Midwest Electric Appliances, Inc., Kansas City distributor, who took part in the convention program were D. G. Keller,

general sales manager, J. W. Puckett, treasurer, and H. C. Doss, sales promotion manager. At the dinner in Hotel Muehleback following the convention, a number of vaudeville acts were presented. Attendance was estimated at 350 dealers and salesmen.

Earl Bowell, wholesale representative of Midwest Electric Appliances, chartered special busses to take more than 60 dealers and salesmen from Wichita and western Kansas to the Kansas City meeting.

B. S. Ashley, P. N. Sterns, and E. E. Colladay of the staff of National Electric Supply Co., Washington, D. C., distributor, took part in the meeting held there.

One hundred fifty dealers and salesmen attended the convention held by the Albert Ahrens Co., Oklahoma City, which ended with a banquet and floor show at the Harkins hotel. Mr. Ahrens and his sales promotion manager, C. I. Harris, spoke at the dinner.

Five hundred persons attended the Dallas, Tex., convention, staged by Electric Household Appliances, Inc., at Hotel Adolphus. Chartered busses brought G-E representatives to the

## Leads Troupe



PAUL DOW  
Heads Eastern troupe dramatizing G-E 1935 plans to dealers.

## Hercules to Retail Servel-Made Units

CHICAGO — Hercules Refrigerator Sales Co., a newcomer to the electric refrigeration industry, has recently opened a display in the Merchandise Mart here, and is specializing in direct sales to chain and department stores, featuring three models of 5, 6.2, and 7.75-cu. ft. net capacities.

The unit for these refrigerators is a top-mounted, conventional, reciprocating type, package job, manufactured for Hercules by Servel, Inc., Evansville, Ind., which also makes Hercules gas engines and truck bodies, Servel electric commercial refrigerating machines, and Electrolux gas refrigerators.

Servel executives assert that they do not have any official or corporate connection with the new firm.

All models will have electric light, double depth tray, patented rubber grid with trigger release, chrome evaporator and tray fronts.

R. R. Dwyer, until recently west coast manager for Major Appliance Corp., heads the new organization. B. M. Kane of the Kane Co., Cleveland, will handle the eastern territory, and J. B. Nicholson, former western representative for Leonard Refrigerator Co., the west coast operations.

## Stewart-Warner Selects 3 New Distributors

CHICAGO—Three new distributors have just been appointed by Stewart-Warner Corp. to handle S-W refrigerators and radios. They are:

The Automotive Sales Co., Iver Schmidt, president, Memphis, Tenn.; Shadbolt & Boyd Co., Hamilton Suter, general manager, Milwaukee; and the El Paso Lumber & Paint Co., W. H. Petersen, president, El Paso, Tex.

## G-E Introduces Balltop Model, Larger Flatops

### Forced Oil Lubrication and Other Refinements Are Incorporated

CLEVELAND—Introduction of four new models, including the "Balltop" version of the Monitor Top, and the adoption of hermetically sealed units in all Flatop models but the two new large ones, marks the presentation of General Electric's 1935 line of household electric refrigerators.

G-E's new 4-cu. ft. "Balltop" model in the Monitor Top line is designed principally for apartment house application. Its Monitor Top unit is enclosed in a spherical steel casing which, with the cabinet top condenser supporting it, has smooth walls with all surfaces exposed.

Other new models include a 6-cu. ft. Monitor Top, and two Flatop models of two-door design with capacities of 12 and 15 cu. ft., respectively.

The complete 1935 G-E line of refrigerators consists of 4, 5, 6, and 7-cu. ft. Monitor Top models with Glyptal-baked enamel exterior finish and interior finish of white porcelain; 5, 7, and 9-cu. ft. Monitor Top models with interiors finished in porcelain and exteriors of removable porcelain-enameled steel panels; a twin-7 or 14-cu. ft. Monitor Top model of porcelain; 4, 5, and 7-cu. ft. hermetically sealed Flatop models with Glyptal-baked enamel exterior finish and porcelain interiors; Liftop model, porcelain interior and top and Glyptal-baked enamel exterior; 12 and 15-cu. ft. two-door Flatop models with exterior and interior finish of white porcelain.

Delivered prices in zone 1 for the new models (capacities of each model are found in specifications on page 4) of General Electric refrigerators are:

Liftop models—LK-1, \$79.50; LK-2, \$84.50.

Flatop models—K-4, \$134.50; K-5, \$164; K-7, \$229; Deluxe Flatop models—KF-12, \$470; KF-15, \$520.

Monitor Top models—X-4, \$124.50; X-5, \$164; X-6, \$199; X-7, \$234; T-5, \$189; T-7, \$269; T-9, \$335; T-14, \$533.

An important mechanical change (Concluded on Page 4, Column 4)

## N.Y. Delco Dealer to Handle Savage Line

NEW YORK CITY — General Appliance Corp., metropolitan New York distributor for Delco Heat products, has been appointed distributor in the same territory for Savage Arms Corp.'s Zephyr air-conditioning equipment.

Mumford-Hinrichsen, Inc., will continue as special distributor of Zephyr equipment, with its efforts concentrated on the architectural, engineering, and contracting fields.

Display and demonstration models have been installed in the General Appliance Corp.'s offices, and several dealers have been appointed. A campaign is under way to complete the dealer organization within the next 30 days.

The company is planning to complete air-conditioning exhibits to be held in March, to include the new Zephyr 40-window ventilator-air washer-humidifier, cabinet room-cooling units, and the line of large capacity units ranging from 1 1/4 to 10 tons refrigeration. A training course for dealers and salesmen will follow the exhibit.

## Dept. Store Supervisors Named by Frigidaire

DAYTON — Twenty Frigidaire department and furniture store contact men and executives of Frigidaire Corp. met here recently to discuss 1935 department and furniture store activity.

Announcement was made of the appointment of two men to supervisory posts, C. W. Kirby, eastern representative of the division, and H. D. Gibson, western representative. Both men will make their headquarters at the general offices of Frigidaire Corp. in Dayton.

Charles T. Lawson, manager, household division, Frigidaire Corp., was chairman of the meeting.

## Sparton Distributors Consider 1935 Plans Seriously at Recent Convention



Sparton distributors are serious about their 1935 prospects, judging from these candid-camera snapshots, taken during their mid-winter meeting last month in Jackson, Mich. (1) Joe Hendrickson and Warren Cox of the Midland Radio Co., Cleveland, in the right foreground, listen to words of weight from a Sparton leader. (2) Mr. Aitchie of the Danville, Ill., Electric Co., and Mr. Cuthrell of the Cuthrell Co., Norfolk, W. Va., gaze into the future with sober mein. (3) L. H. Murphy and Charles Wommeldorf of Victor Basil, Inc., Toledo, ponder weighty problems.

### Detroit Outlet Holds Grunow Open House

DETROIT—The 1935 line of Grunow electric refrigerators and radios was shown to more than 200 dealers and salesmen of the eastern Michigan territory by the Specialties Distributing Co., distributor, at a two-day open house, Feb. 19 and 20, in the Hotel Book-Cadillac.

Leonard and Robert Turnbull, proprietors of the distributorship, were the hosts, with L. M. Holsappel, radio and refrigeration engineer, and Otto H. Bowman, division manager, as assistants from the General Household Utilities Co. plant in Chicago.

Salesmen William Hayden, George Dean, and William Prentis, Radio Service man Brad Pyle, Refrigeration Service men Earl Stafford, Harold Kobich, and Arthur Schmitz, and Traffic Department Manager Blake Cousineau were on hand throughout the showing to explain to dealers the

features and selling points of the 1935 Grunows.

Displayed at the open house were models in the standard, deluxe, and super deluxe lines.

Also shown was an open model of the Grunow compressor, open at the top and glassed-in at the bottom to afford a view of the unit in action. On one side of the unit is a thermometer incased in a glass tube, and into which Carrene is drawn, to demonstrate its efficiency.

One advantage of the open-house meeting, according to co-proprietor Leonard Turnbull, is that it encourages dealers to study the line better and to ask more questions, and sends them back home with a better knowledge of the product they are selling.

In a larger group, Mr. Turnbull thinks, some of the more timid dealers hesitate to ask questions about the models, features, and other things, and thus enter the selling field without information they need to help them against competition.

### Starr-Freeze January Sales Increase 199%

RICHMOND, Ind.—January sales of Starr-Freeze electric refrigeration equipment were 199 per cent of those for the same period of 1934, reports Secretary Fred Gennett of the Starr Co. here.

Big factor in the increase was the sale to the United States government of several restaurant-type commercial units for use on board American destroyers.

### Stuefer Opens New Branch In St. Paul

ST. PAUL—The St. Paul branch of O. F. Stuefer, Inc., Minneapolis General Electric distributor, has opened a new store in the Oppenheim building here. Jack Hickok is manager of the new branch.

### Judge in Alabama Case Decides TVA Exceeds Power in Selling Electricity

(Concluded from Page 1, Column 3) tems, transmission lines, and the site of the Joe Wheeler dam, for approximately \$2,200,000.

Judge Grubb in his decision said he had informed counsel he would consider the validity of this contract, which was not exercised, but which "throws light on their intentions."

"It seems to me," said the judge, "that the TVA purchased from the Alabama Power Co. for the same purpose as that of the Alabama Power Co.—to pursue the business of a utility. It seems to me that the right to do that depends on the showing of constitutional power."

"They offer evidence tending to show it was connected with navigation, or with national defense, and other activities. There is no doubt that if the doing of this business of selling retail and wholesale power electricity is attached to any one of these powers, it is legal."

"But if it could be attributed to one of these powers, then the TVA would be in the position of doing utility business in the state of Alabama, and it would be *ultra vires* and illegal."

"Whether the act (creating the TVA) is unconstitutional or illegal, delegation of powers is a matter of debate on which I do not find it necessary to pass."

Judge Grubb said of any "surplus legitimately created" there is an "implied right to sell," but held the TVA regarded "all power as a surplus."

Concerning the injunction against PWA loans, Judge Grubb said:

"With reference to the restraining order, I held that PWA ordinarily has the right to lend money. However, it is clear that PWA and TVA, both branches of the government, had an understanding that PWA lend the money to provide a market for TVA's power."

"If the business is illegal, then through its knowledge of the fact PWA has no right to lend the money, and the injunction ought to be made permanent."

In concluding defense arguments, Mr. Fly told Judge Grubb that the only specific question before the court was whether the TVA had the right to "purchase a little transmission line which will take wasting power of Muscle Shoals to the market that reaches for it."

The TVA attorney, said the court, in deciding a question of legislative enactment, "did not take into consideration whether he agreed with the enactment, but whether Congress stepped out of the bounds of reason in passing judgment in the first instance."

"The plans, purposes, conjectures, and wild hopes of the Tennessee Valley Authority are not before the

court," he added.

He pointed out that the government for years had found little use for power generated at Muscle Shoals "except to be milked by the company which the plaintiffs represent."

In a reply to a question by William C. Fitts, Jr., associate TVA counsel, as to whether there was any difference between selling power to the Alabama Power Co. and transmitting it to municipalities for sale, Judge Grubb said:

"There is a difference between the government going into the daily business of selling and of leasing. The daily business might be a benevolent dictatorship, but I have never been able to bring myself to see that the United States had any right to go into a retail business."

Mr. Fitts contended the sole question to decide was whether Congress had the power to authorize TVA to build or purchase transmission lines. This, he held, Congress could do.

In enacting the TVA measure, Congress adopted the best plan for a unified and coordinated development of all the resources of the Tennessee river and utilized all resources for improvement of navigation, flood control, and other values, Mr. Fitts said.

Movement for the suit began after the Alabama Power Co. signed a contract with TVA to sell 14 distribution systems, transmission lines, and the site for Joe Wheeler dam to the TVA. By this act, the utility virtually would have withdrawn from northwest Alabama.

### Crosley Distributor in Terre Haute Moves

TERRE HAUTE, Ind.—Advance Electric Co., distributor for Crosley refrigerators and radios for Terre Haute and territory, has moved to its new business home at 545 North Sixth St.

### Grunow Unit Installed In Vatican

CHICAGO—A Grunow refrigerator and radio have been installed in the Vatican in Rome, Italy, it was learned from officials of the General Household Utilities Co. recently.

### Campli Heads Apollo Credit Department

NEWARK—John Campli was recently appointed credit manager of the Apollo Distributing Co., Crosley distributor for this city, reports Fred Goldberg, treasurer of the company.

# ACCEPTANCE

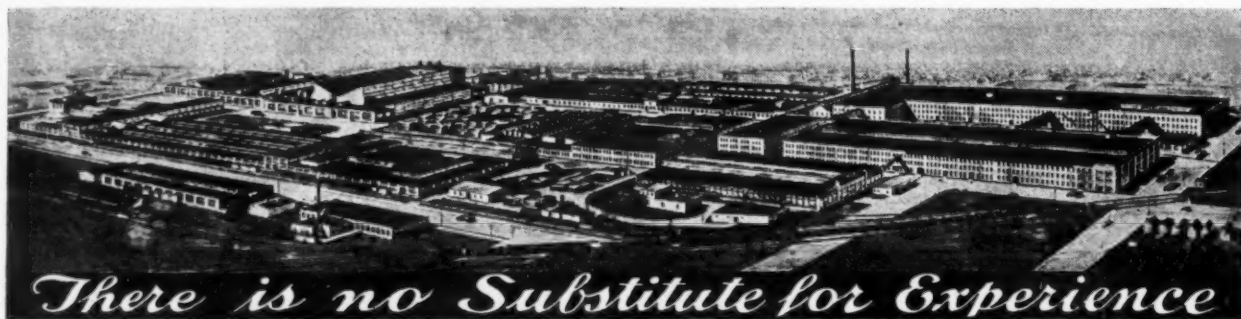
The dealer can sell Servel Commercial Refrigeration and Air Conditioning equipment with full confidence that his own reputation is protected by Servel's time-proven acceptability. For more than ten years and in more than thirty countries of the world, Servel equipment has been giving complete satisfaction to thousands of users. This background of Servel's success is an important safeguard to the dealer's own business.

# SERVEL

## COMMERCIAL REFRIGERATION

SERVEL, INC. Commercial Refrigeration Division EVANSVILLE, IND.

This great modern 30-acre plant is the home of Servel Commercial Refrigeration and the world-famous Electrolux, the Servel Gas Refrigerator



*There is no Substitute for Experience*

### SPECIAL LOW PRICE OFFER of Exact Food Reproductions

An attractive display of our artificial foods will give life to your refrigerator, show the capacity, and make a more personal appeal to the purchaser.

Our Food Reproductions are made from a patented composition that will not fade, melt or sag, and are not subject to disintegration and climatic changes, and are actual reproductions as to color, size and texture.

#### Here is what you get

- |                   |            |
|-------------------|------------|
| 1 Roast Chicken   | 1 Lettuce  |
| 1/2 pt. Cream     | 1 qt. Milk |
| 6 Assorted Fruits |            |
| 2 Peppers         |            |
| Red and Green     |            |
| 1 lb. Butter      |            |
| 1 Cucumber        |            |
| 2 Tomatoes        |            |

**SPECIAL ASSORTMENT NO. 5 - \$10.00**  
**REPRODUCTIONS COMPANY**  
 235 Franklin St., Boston, Mass.

Please send me collect the food reproductions listed at \$10.00, which you guarantee to be exactly as represented or send me information on refrigerator assortments.

Name \_\_\_\_\_ Street \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

# NOW! THE MOST FAMOUS REFRIGERATOR MECHANISM IN THE WORLD IN ALL 1935 G-E MODELS\*



A dozen models—Monitor Top, Flatop, Liftop—and a new low-priced Monitor Top (model X-4) specially designed for small homes and apartment houses

\*All single door and Liftop types

**T**HE famous G-E Monitor Top hermetically sealed-in-steel mechanism—that has made refrigeration history with an unequalled record for dependable performance at low cost—is now available in all 3 types of 1935 General Electric refrigerators—Monitor Top, Flatop and Liftop. This is the mechanism that won for the General Electric the greatest public preference ever enjoyed by any electric refrigerator.

## PERFORMANCE COUNTS!

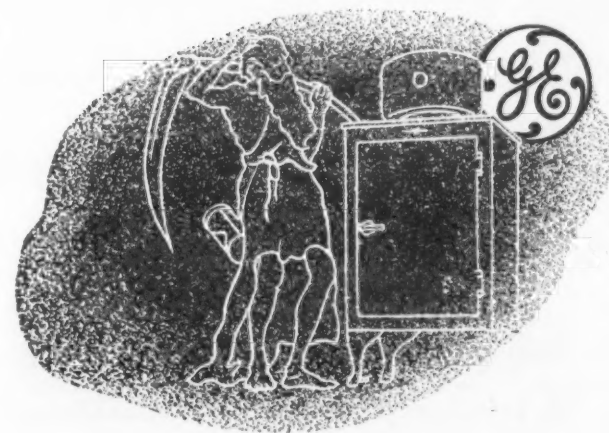
To the dealer, no other feature of an electric refrigerator is as important as its mechanism. After all, it's the *performance* of any refrigerator that determines its real money-making value to the retailer and its real worth to the customer. If it continues to give satisfactory, economical service year after year, the dealer has no expensive, profit-eating service problem.

## 5 YEARS PERFORMANCE PROTECTION

In addition to the standard 1 year warranty, 1935 G-E refrigerators carry 4 more years protection on the matchless sealed-in-steel mechanism for \$5... five full years for only \$1 a year!

The customer, with a refrigerator that exceeds even the greatest expectations of dependable performance, enthusiastically recommends it to friends and neighbors, and new sales result.

The General Electric dealer has the added advantage of selling other G-E Kitchen appliances and Laundry appliances to his *satisfied* refrigerator customers. And it all goes back to the amazing performance of the G-E refrigerator's sealed mechanism—the ONE outstanding sales feature in refrigeration today. This year, General Electric is putting major emphasis on the unparalleled performance story of the General Electric refrigerator. It's going to be a *big* year for G-E dealers! Write or wire for details of the General Electric franchise. General Electric Company, Specialty Appliance Sales Department, Section DF22, Nela Park, Cleveland, Ohio.



## THE REFRIGERATOR THAT DEFIES TIME!

Monitor Tops in use in homes for 6 and 7 years have been cut apart at the General Electric Research Laboratories and found to be in such first class condition that it is impossible to place a limit on the years of service to be expected from this matchless sealed-in-steel mechanism.

**GENERAL  ELECTRIC**  
ALL-STEEL REFRIGERATORS

## Two New Frigidaire Executives



Left to right: Charles T. Lawson, manager, household division, Frigidaire Corp., with C. W. Kirby and H. D. Gibson, newly appointed supervisors in the department store division, who will contact major retail stores.

## 'Quota Busters' Seek Trip to Factory

MANSFIELD—Grand prize for 1935 to be awarded to the 125 leading members of the Westinghouse "Quota Busters Club" is a trip to the factory here. Each district has been allotted a definite number of prize trips.

The three classes of membership in the club are:

Class A: This class has the highest quota because it includes all salesmen working in territories with a high refrigeration sales potential, as well as all retail and apartment house supervisors.

Class B: Salesmen allotted to this class are usually identified with dealers whose annual sales expectancy is between 25 and 75.

Class C: Salesmen in Class C are those working in smaller trading areas.

Credits obtained by members of the club are based on size and type of refrigerators sold, not alone on the number of units.

In addition to the grand prize awarded to the 125 leading winners, embossed badges are given to "line riders," or salesmen who have "busted" any one of their quarterly quotas. A bronze emblem is conferred the first year, silver the second, gold the third. A ruby is set in the gold badge of the salesmen who make the grade of busting quota four years in succession.

Members of the "Inner Circle"—dealers and salesmen who make a "plus" quota of 125 per cent of the year's quota—receive a gold signet ring. Each succeeding year's membership is acknowledged by a small diamond set in the escutcheon.

## Baker to Promote Sales Of Columbus Shop

COLUMBUS, Ohio—William H. Baker has been named sales promotion manager of the Good Housekeeping Shop, electrical appliance firm here.

## Average Modernization Job in 10 Cities to Cost \$338

WASHINGTON, D. C.—Analysis made by the Federal Housing Administration of the purposes for which \$5,254,150 were pledged by 17,052 residents of 10 typical cities during the Better Housing campaigns, shows that the average amount per job will be \$338, with the greatest percentage of this sum—26.2 per cent of the money pledged—going toward paying for exterior painting.

An additional 5.39 per cent includes further paint items for interior decoration. General repairs furnish the next largest division of work to be done, 24.92 per cent of the pledges calling for this type of expenditure.

Roofing needs are the next in line, according to the number of persons signing up for this item which furnishes 11.51 per cent of the work total. Miscellaneous disbursements, including fixtures, will consume another 10.72 per cent of the pledge money, while heating, plumbing, exterior repair, cement work, lighting, bath room and kitchen remodeling, and the addition of rooms and garages account for the remaining pledges.

The 10 cities selected for the survey, upon which the analysis is based, are: Burlington, Vt.; Charleston, S. C.; Colorado Springs, Colo.; Fresno, Calif.; Indianapolis, Ind.; Salem, Ore.; St. Cloud, Minn.; Sioux City, Iowa; Troy, N. Y.; and a grouping of Orange, West Orange, and East Orange, N. J. Combined population of these communities is \$72,040.

Fresno, Calif., sixth in size of the cities listed, showed the largest response to the campaign in point of dollar value and number of operations. The greatest need noted in Fresno was for general repairs, while no demand was shown for remodeling of bath rooms or kitchens.

Sioux City, Iowa, produced the greatest number of decorating jobs, while heating supplied the largest number of pledges in Indianapolis. In the Orange group, not one resident found roofing repair necessary.

## Ice-O-Matic Names New Distributors

BLOOMINGTON, Ill.—Williams Oil-O-Matic Heating Corp. has announced appointment of a number of new distributors of 1935 Ice-O-Matic electric refrigeration equipment. Distributors are as follows:

Household refrigerator line only: A. L. Fink Electric Co., Cincinnati; Schmoller & Mueller Piano Co., Omaha, Nebr.; Heat & Power Engineering Co., Toledo; L. V. Whitney Distributor Corp., Chicago.

Entire line: Jenkins Music Co., Kansas City, Mo.; Rutledge Sales Co., Pittsburgh, Pa.; I. W. Phillips & Co., Tampa, Fla.; Bay View Furniture Co., Grand Rapids, Mich.

Commercial and milk cooling equipment: Bowers Bros., Augusta, Ga.; Jordan Music Co., Charleston, S. C.; Orchard & Wilhelm Co., Omaha, Neb.

Commercial: Quillen Bros. Refrigerator Co., Indianapolis.

Household and commercial: Bain Hardware Co., Lexington, Ky.

Milk Cooling equipment: Warner Distributing Corp., Syracuse, N. Y.

Under special arrangement, the Pevely Dairy Co., St. Louis, sells Ice-O-Matic equipment to its milk producers.

## Leonard Shipments In January Up 27%

DETROIT—Shipments by the Leonard Refrigerator Co. for January were greater by 27 per cent than those for the same month of 1934, and exceeded those for any other January in the company's history, Leonard officials reported last week.

Since the beginning of the present fiscal year (Oct. 1) total shipments have amounted to 50 per cent more than they were for the same period of the previous year, it was said.

## Committee Named by Cleveland Dealers

CLEVELAND—Members recently appointed to the 1935 Cleveland Retail Refrigeration committee are: Carl E. Fruehauf, Fruehauf Hardware Co., chairman; Robert S. Dubois, Halle Bros. Co.; Joseph Meeks, Wm. Taylor Son & Co.; Victor G. Ptak, Ptak's Music Stores; Howard Silver, Watkins Furniture Co.; L. E. Tompkins, L. E. Tompkins Co.; and Nelson P. Wright, May Co.

## Massachusetts Dealers For Kelvinator Named

BOSTON—Jordan Marsh Co., Boston; Harvard Cooperative Society, Cambridge; and Stuart, Bates & Co., Brockton, have been appointed dealers for Kelvinator equipment, reports Harry Troutwine, manager of the Boston branch of Kelvinator.

## Dinner Cooked in Locked Oven Sells Ranges

WISCASSET, Me.—A dinner placed in an oven and the oven door padlocked by the sheriff resulted in sales of 2 G-E refrigerators, 4 G-E ranges and several small appliances, reports George Perry, salesman for Central Power Co., here.

The range was timed to start at 5 p. m. and to shut off at 8 p. m., when the sheriff unlocked the oven door and removed the dinner in the presence of local housewives. The demonstration took place in a vacant store.

## Fuel Saver Inventor to Sell Crosleys

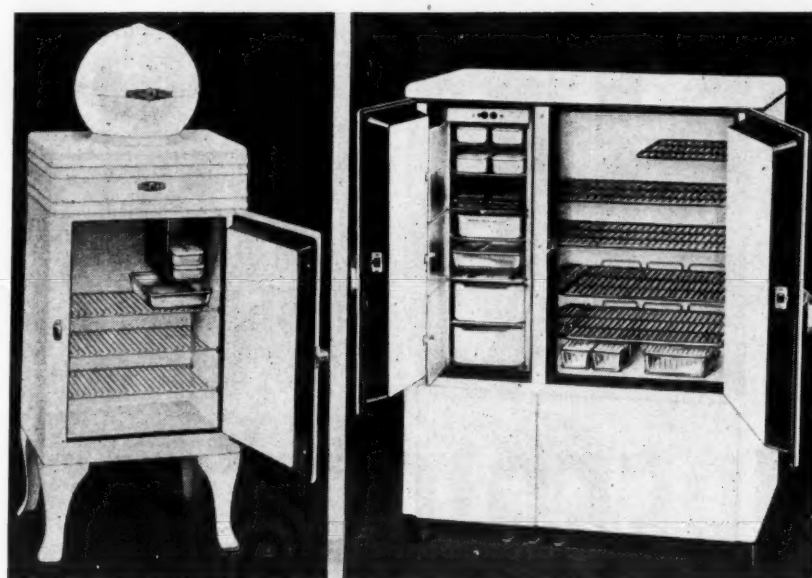
RICHMOND, Va.—W. F. Gerhardt of this city was recently appointed dealer for Crosley electric refrigerators by Tower-Binford Electric & Mfg. Co., distributor.

Mr. Gerhardt is the inventor of the Gerhardt fuel saver, an attachment which conserves furnace heat.

## 300 Buffalo Dealers Attend F-M Meeting

BUFFALO—Approximately 300 dealers attended a recent meeting held here by Jos. Strauss Co., distributor for Fairbanks-Morse Home Appliances, Inc., in Buffalo and western New York.

## New Members of G-E's Family



At the left is the 'Balltop' addition to the Monitor Top line and at the right is one of the new large Flatop models of G-E 1935 line.

## G-E Introduces 4 New Models and Forced Oil Lubrication

(Concluded from Page 1, Column 5)

incorporated in all G-E 1935 models is forced oil cooling. The method employed provides not only forced oil lubrication but utilizes the same oil for cooling the motor, thus prolonging life of motor and giving more quiet and efficient operation.

The five-year service policy on the G-E hermetically sealed units (one year warranty and four year's service protection for \$5 extra) is retained.

The welded stainless steel super freezer, introduced by General Electric in 1932, is found in all 1935 G-E models. The new models also are equipped with the high-speed refrigerant injector which is said to speed up ice cube freezing.

Cabinet designs remain virtually the same as last year, G-E executives being satisfied with Henry Dreyfuss' styling of the Flatop models.

New selling argument for retailers of the G-E line this year is the claim of company engineers that the operating consumption in the 5 and 7-cu. ft. models has been reduced from 50 kwh. per month in 1929 to 30 kwh. per month in 1935. Claims of similar savings in operating costs are also made for other models in the line.

The new 12 and 15-cu. ft. two-door models follow the same styling as the smaller Flatops. Cabinets are all-steel with white porcelain exterior and interior finish.

Features of these models include a vegetable bin in the lower left-hand corner, under the food compartment. Both cabinet doors and vegetable bin can be opened by the foot pedal. The cooling unit has six large trays for ice and dessert freezing, a low-temperature compartment for storing frozen foods or desserts, a chiller tray for additional storage, and two refrigerated vegetable drawers.

A control for fast or slow freezing, equipped with a defroster which allows uninterrupted refrigeration during defrosting, is another convenience.

Refrigerating units in the hermetically sealed Flatops are located in the bottom of the cabinet. The liquid refrigerant line from the compressor is connected to a large corrugated steel type condenser plate through which the compressed refrigerant is circulated to cool and liquefy. The condenser plate is on the rear of the refrigerator and is so designed that unrestricted air flow over its surface—through chimney action—is assured. Cooling of the condenser plate and compressor is accomplished by natural air circulation.

The refrigerating unit in the Liftop model is located in the bottom of the cabinet. Heat from the compressor is dissipated from a copper condenser coil which is fastened to the outer cabinet casing, making a condenser surface of the exterior surface of the cabinet.

In the Monitor Top models, an improvement made this year is in the refrigerated shelf so that all ice trays are in direct contact with refrigerated surfaces. The evaporator is designed so that when trays of water are placed in it, the refrigerating unit will start to operate and continue to run until the water is frozen, thus eliminating the need of turning the temperature control knob to the coldest position.

Temperature control on the Monitor Top models performs a number of functions. It regulates the temperature in the refrigerator automatically, provides overload protection for the motor, and also provides a starting relay for use in starting the motor. In addition, the control has an "off" and "on" switch, a temperature adjustment dial, and a defrosting position.

In the forced oil lubrication and cooling system for the Monitor Tops, a small oil pump on the bottom end of the shaft circulates approximately three quarts of oil per minute through the mechanism. Approximately 6 to 8 lbs. pressure is maintained on all bearing surfaces.

After oil has passed through the compressor it divides. Part is sprayed against the upper part of the steel housing, from where it flows down around the inner surface, thus carrying the heat from the mechanism to the housing where it is dissipated into the room air. The motor windings, submerged in oil, operate at lower temperatures.

A feature of the G-E Monitor Top mechanism is the pressure-operated unloader which at stopping takes all load from the compressor when it is approximately at half speed, and likewise on starting keeps the load from the compressor until it has reached half-normal speed.

An arrangement of acoustic mufflers on both the intake and discharge lines is said to reduce pumping noise to a minimum.

## 210 Crosley Dealers in TVA Area Meet

NASHVILLE, Tenn.—Two hundred and ten Crosley dealers from the TVA territory attended the meeting held recently at the Andrew Jackson hotel here by the Gambill Distributing Co., Crosley distributor for Nashville.

Wholesale Gambill, Jr., president of the Gambill Distributing Co., discussed the opportunity for selling refrigerators and radios in the TVA territory. J. V. Rogers of the EH&FA, division of TVA, spoke on the work of the organization and what it means to people and business men of the Tennessee Valley.

## Crosley Makes Blow-ups of Magazine Color Ads

CINCINNATI—Crosley Radio Corp. is sending its electric refrigerator dealers blow-ups of two full-color magazine advertisements planned in connection with its 1935 Shelvador campaign for use in their showroom windows.

The Crosley slogan, "this much more in a Shelvador," is the guiding theme, and the first display is given over to a large-size view of the Shelvador itself, with copy emphasizing its convenience features and extra food storage capacity.

The second broadside is a full-color reproduction of the entire Shelvador and Tri-Shelvador line, showing each model with door opened and closed.

## Specifications of General Electric 1935 Models

Model No.	X-5	X-6	X-7	T-5	T-7	T-9	X-4	K-4	K-5	K-7	KP-12	KP-15	LK-1
Overall Dimensions (in.)													
Height	65½	64½	66½	65½	67½	68	61½	52½	52½	56½	62½	62½	36
Width	24	28½	28½	24	28½	34½	23½	23	26½	29½	39	46	21
Depth	21½	22	22½	21½	22½	26½	19½	23½	23½	25½	27	27	23½
Storage Capacity													
Net food storage (cu. ft.)	5.0	6.3	7.0	5.0	7.0	9.6	4.0	4.3	5.2	7.0	12.5	15.4	...
Total shelf area (sq. ft.)	8.9	11.8	12.5	8.9	12.5	16.1	8.1	8.6	10.2	13.0	22.7	29.3	...
Ice Cube Trays													
No. of trays	2	4	4	2	4	4	2	2	2	4	6	6	2
No. of cubes	40	84	84	40	84	84	40	40	40	84	128	128	20
Weight of cubes (lbs.)	6	8	10½	6	10½	11½	4	4	6	10½	14½	16½	2

# Copeland

DEPENDABLE ELECTRIC REFRIGERATION

The new line of Household Models of  
**Copeland Refrigerators**  
will shortly be announced.

Attractive cabinets, scientific arrangement  
of interiors, maximum food storage and  
**Copeland Dependability**  
at reasonable list prices, with attractive  
discounts.

Some distributing territory is still available. Reservations now being made.

**COPELAND REFRIGERATION CORP., DETROIT, MICH.**  
Main Office and Factory—Holden Ave. at Lincoln  
Division of DALLAS E. WINSLOW, Inc.

# ALL EYES ARE ON THIS NEW REFRIGERATOR

## FOR THE *Streamline Age*



"AT LAST! ALL-METAL  
SELF-EJECTING TRAYS!"



"SMARTEST STYLING  
I EVER SAW!"



"THAT HANDY-TRAY IS REALLY WONDERFUL!"



"JUST LOOK AT THAT  
REVOLVING SHELF!"

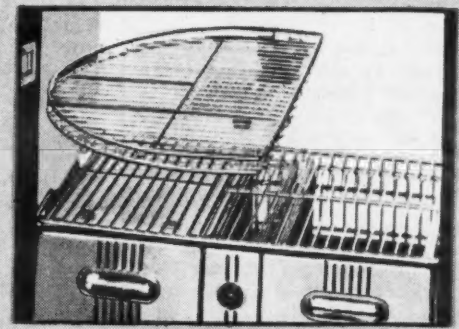


"FIVE YEARS'  
SERVICE  
PROTECTION,  
TOO!"



NEW REVOLVING SHELF  
increases ACCESSIBLE STORAGE SPACE

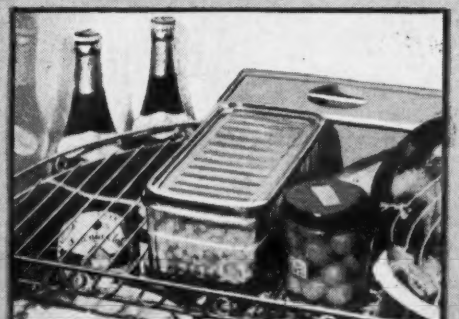
THE TALK OF AMERICA  
IN 1935... a new feature  
to demonstrate and sell



SHELF REVOLVES... EVERYTHING ON  
IT IS INSTANTLY WITHIN EASY REACH



TURNED HALF-WAY, IT MAKES EVERY  
BIT OF THE SHELF BELOW ACCESSIBLE



EXTRA SPACE FOR TALL BOTTLES AND  
CANS IS PROVIDED IN THE CORNERS

● *New outside! New Inside!* The most sensational advertising program in refrigeration history is RIGHT NOW directing America's eyes to the NEW 1935 Westinghouse Refrigerator! TODAY... in YOUR town... hundreds are saying, "THAT'S the refrigerator we've been waiting for!" What an opportunity for the live-wire merchant who is doing business under the Westinghouse "Protected Profits" Franchise!

Amazing new features for dramatic demonstrations and quick sales! New, up-to-date styling to catch the modern eye for beauty! A COMPLETE line to meet every prospect's requirement... with ONE high quality at strictly competitive prices... EVERY MODEL powered with the PERFECTED Westinghouse Dual-Automatic Mechanism, backed by FIVE YEARS'

SERVICE PROTECTION at a cost of only \$5, included in the price! Here's everything you need to make 1935 the biggest money year you've ever had.

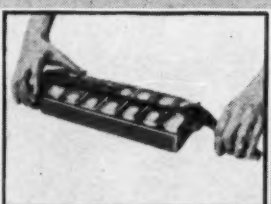
Write, wire, phone or mail the coupon for full details on this biggest news event in the household products field. The quicker you start, the more money you'll make. Send NOW for the facts and figures on the hottest refrigeration proposition in America.



# Westinghouse

## *Streamline* REFRIGERATORS

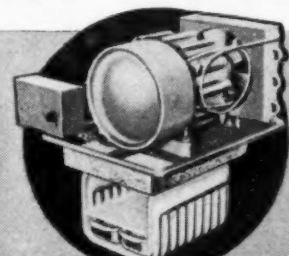
NEW SALES APPEAL • NEW CONVENIENCE • NEW FEATURES



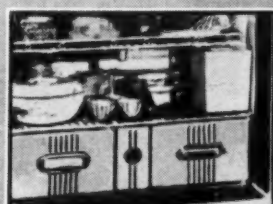
An amazing invention —  
the all-metal, lever-action  
"Eject-o-Cube" tray.



7-Point Dial Temperature  
Selector with "Econ-o-  
matic" features.



Hermetically-sealed  
mechanism, forced-draft  
cooled, permanently oiled.



Triple-Storage Compart-  
ment — for vegetables,  
fruits, eggs, and butter.



Button-Touch Door Latch  
— at convenient height —  
always easy to operate.

Westinghouse Electric & Mfg. Co.,  
Refrigeration Dept. 43, Mansfield, O.  
Rush full details on 1935 Westinghouse Refrigerator  
line, features, advertising and sales plans.

Name.....

Address.....

City..... State.....

## PERSONALITIES

By George F. Taubeneck

### Concerning Mr. Biechler

No little interest was stirred up among readers by our announcement of "coming features of the Personalities page" in the last issue. Questioners wanted to know, first of all, just what it is that President E. G. BIECHLER of Frigidaire is liable to do, and why Presidents GEORGE MASON of Kelvinator and HOWARD BLOOD of Norge had better "look out for him."

Sorry we can't report that Messrs. Mason & Blood were among their number. It would have made us feel right good if either or both of these gentlemen had phoned us—in a fever heat of excitement—and demanded to know what "Biech" had up his sleeve now.

But both proved to be imperturbable.

Let us hasten, however, to allay the apprehensions of others. Frigidaire's able and forceful president does not—to our knowledge—plan to knock the bottom out of the market with startling new prices, nor does he propose to start any sort of advertising war against Norge and Kelvinator.

He has simply become camera-conscious, like Presidents Blood & Mason. In off moments at the New York Frigidaire meeting in the Waldorf-Astoria, Mr. Biechler spent considerable time investigating the merits of the Zeiss Contax miniature camera (really, the Zeiss people should pay us a promotion retainer), and asked us so many questions about it he had us dizzy.

He had been watching the candid camera pictures in *ELECTRIC REFRIGERATION NEWS*, and had been awaiting a chance to find out all about them.

Later one of his associates told us that Mr. Biechler was so definitely interested that he expected him to order one immediately. So we have the temerity to say "look out" to Presidents Blood & Mason, whose

Leica pictures have become so famous around the industry.

Mr. Biechler has such extraordinary powers of concentration and energy that he gets very quickly to the bottom—or the top, as the case may be—of anything he tackles (that's precisely the word for what he does to any new problem) that he will surely give these two experts a run for their money in amateur photography. And especially if he gets a Contax he will have an advantage over his Leica-using compeers (this is Round 11 in the Leica-Contax argument which has been running between the three of us for a year or so).

### Introducing the Chryslers

Next most-frequently-asked question was: "What about the Chryslers? What kind of fellows are they, and how seriously are they taking this air-conditioning business?"

We'll answer the last question first. From all we can gather, they are taking air conditioning fully as seriously as General Motors, or General Electric, or any of the other big corporations which have gone into the business. Fact is, they fully expect to become the most important concern in the industry, and they don't hesitate to say so.

First indication of their seriousness is their price schedule. A list price of \$385 for a ½-ton self-contained air-conditioning unit is sumpin'. And so is their quotation of \$75 for a small conditioning cabinet which needs to be hooked up to heating and cooling sources.

On this latter job—designed especially for hotel rooms—it has been suggested that refrigeration could be obtained by tapping the circulating ice-water pipes. Some of us would like to know how cold the "ice water" would be in Room 721 when the feller in Room 621 was enjoying a cooled room—wouldn't Mr. 721 be surprised

to find steaming hot water issuing from the ice-water tap, and wouldn't he cuss!—but perhaps that question is a little off-side.

The truth of the matter is that Chrysler is fully equipped to do a real job in air conditioning, and has every intention of doing it.

### Walter Jr. and Jack

WALTER P. CHRYSLER, JR., president and chairman of the board of Airtemp, Inc. (sales organization for Chrysler air-conditioning products) is an extraordinarily earnest young man.

He seems to be as serious-minded, sincerely intent on making his own way in a big way, and honestly capable as WALTER P. CHRYSLER, SR., could possibly hope for in a son worthy of carrying on the traditions of the Chrysler name.

He makes a very good speech, shakes hands like he means it, at once makes you feel as if he were personally interested in you as soon as he meets you, fraternizes with his associates well, and in general leaves a most commendable impression with those who make his acquaintance.

This is not his initiation into business. Not long after his schooldays he ventured out on his own as a book publisher. We have two of the books put out by his Random House in our own library, and we're mighty proud of them.

Next time you're in our office, ask to see our copy of Stenhen Crane's "The Red Badge of Courage," which Walter, Jr., published. It's one of the show pieces of our collection.

Being in the publishing business ourselves, we can appreciate Mr. Chrysler's good taste and his feeling for quality. We'll venture to predict that he'll tolerate no shoddy merchandise in the Airtemp line.

JACK CHRYSLER, a younger brother and a director of Airtemp, appears to be of a quieter, more rugged mold. He has been working in overalls around the Chrysler plants here in Detroit for some time and, despite his shyness, has won for himself quite a following of friends. And his associates will tell you privately that he's the "real stuff."

Candid camera snapshots of these

two young men—taken at a recent banquet in Detroit for Airtemp distributors—appear at the bottom of the page.

### 3 Frigidaire Alumni

Old-head guidance in Airtemp councils is provided by three former high executives of the Frigidaire Corp. General Sales Manager H. C. JAMERSON of Airtemp was once household refrigeration sales manager of Frigidaire, and later a branch manager.

J. C. CHAMBERS, who has had a great deal to do with developing the line and getting the ball rolling, was formerly sales manager of Frigidaire's air-conditioning department. LES KEILHOLTZ, who is now in the Chrysler air-conditioning engineering department, was for many years Frigidaire's chief engineer.

At one time we stated on this page that Mr. Chambers—who was then head man in air conditioning over at Frigidaire—seemed to know more about small space air conditioning than any man we had ever met (and we're acquainted with most of the experts in this new industry). Talk with him today, and maybe you'll get that idea, too.

Wise counsel is also offered by other members of the Chrysler official family, such as President K. T. KELLER and General Sales Manager A. VANDERZEE of Dodge Brothers, both of whom were present at the Airtemp convention.

### Why Mr. Vanderzee

#### Didn't Read His Speech

Mr. Keller impressed us mightily. He speaks extemporaneously with the quiet confidence and measured locution of one who never talks unless he knows a helluva lot about his subject—and one who knows plenty about many subjects! Instinctively you felt: here is a man who *knows*.

If ever a man looked, acted, and talked like the president of an important automobile manufacturing concern, K. T. KELLER is that man.

Jovial, likeable, and heart-warming is Mr. Vanderzee. He's the sort of man who can speak his mind—and probably does—quite frankly without

offending anybody. No doubt he insults and abuses his sales organization frequently and profusely; and they probably love it, and eat out of his hand.

We had him on the run at the Airtemp banquet, however. On the afternoon preceding the banquet the writer had received three phone calls in quick succession, all asking for material on air conditioning which could be woven into a speech for Mr. Vanderzee.

Curtis Publishing Co.'s local office was first to call, then the Ruthrauff & Ryan advertising agency, and finally an assistant to Mr. Vanderzee. So we hurriedly clipped a batch of our editorials on air conditioning, added a few reports, charts, and tabulations of data (all of which had appeared in *ELECTRIC REFRIGERATION NEWS*), and dispatched a loaded envelope to Mr. Vanderzee.

That night at the banquet we told the story (which we thought quite amusing) to HARRY BERCOVICH of the J. Sterling Getchel agency, which handles the Airtemp account. Mr. Bercovich, who is a first-class gent in addition to being pretty keen mentally, got us to tell the story to Mr. Keller—who roared.

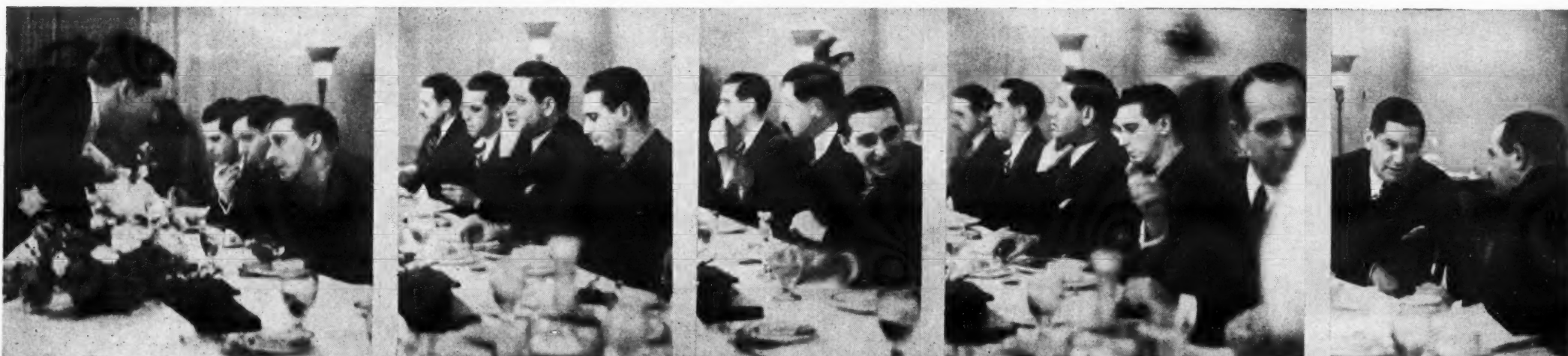
At the banquet Mr. Keller preceded Mr. Vanderzee in the batting order of speakers and he went 'way out on the grass to field the fast one we had thrown him. He not only related the story about the genesis of the forthcoming Vanderzee speech, but kidded his associate so completely that he was left practically speechless.

What made us sore, though, was Mr. Keller's failure to credit *ELECTRIC REFRIGERATION NEWS* with being the source of this air-conditioning material (Curtis and Ruthrauff & Ryan were all he mentioned, and they had merely asked us).

So when Mr. Vanderzee got up he didn't dare look at the manuscript which had been lying before him. Instead he told stories, wisecracked, and ad libbed in such delightful fashion that even the author of his air-conditioning source material (meaning us) was glad Mr. Keller had kidded him out of it.

When a man can talk like Mr. Vanderzee, he doesn't need any source material—his audience will follow along with him anyway.

## Walter P. Chrysler, Jr. and His Airtemp Associates Get Confidential



(1) A distributor leans over the speaker's table at the recent Airtemp convention in Detroit to speak to President Walter P. Chrysler, Jr. (right). (2) Left to right, J. C. Chambers, Jack Chrysler, Sales Manager A. Vanderzee of Dodge Brothers, and Walter Chrysler, Jr. (3) President Chrysler enjoys a hearty laugh. (4) A new personality, that of General Sales Manager H. C. Jamerson, enters the picture at the right—gesturing emphatically. (5) Mr. Vanderzee (left) tells Mr. Jamerson where he can get a good distributor.



(1) Mr. Jamerson, getting highly confidential, speaks behind his hand to the interested Walter Chrysler, Jr. (2, 3, 4, and 5) Messrs. Chrysler, Jamerson, and associates in various moods.



(1) Mr. Vanderzee leans over the shoulders of his boss, President K. T. Keller of Dodge Brothers. (2) Mr. Keller (right) seems to be questioning H. C. Jamerson rather sharply. (3) Mr. Jamerson thinks it over. (4) Mr. Keller does some pondering himself. (5) The white splotch you see in front of speaker H. C. Jamerson is smoke just exhaled by K. T. Keller.

# The idol of the refrigerator industry has become the idol of every housewife

THE F-M REFRIGERATOR, WITH THE NEW CONSERVADOR, IS SETTING A RECORD NOT ONLY FOR DEALERS BUT FOR HOUSEWIVES THROUGHOUT AMERICA . . . . .

● Wide-awake dealers have recognized the importance and exclusiveness of the CONSERVADOR—and have hooked their band wagon to Fairbanks-Morse. American housewives, with a habit of being thrifty, regardless of income—have instantly accepted this new outstanding feature. They like its convenient shelves because it keeps foods most frequently used right up in front where they belong. And they realize that the CONSERVADOR, by sealing in the main storage compartment, prevents the escape of cold air and saves electricity.

There is no doubt about it. The Fairbanks-Morse is selling fast—and sales are increasing daily! Find out about the 1935 F-M franchise. It will be the most valuable move you've ever made. Write, phone or wire for complete information and name of nearest distributor. Fairbanks-Morse Home Appliances, Inc., 430 South Green Street, Chicago.

Cable Address: FAIRMORSE, CHICAGO



## FAIRBANKS-MORSE

RADIOS-WASHING MACHINES-IRONERS



*Refrigerators*

105 YEARS OF PROGRESS IN PRECISION MANUFACTURING

## SERVICE

### How to Service Iroquois Units; 2.-Installation & Repair

**I**NSTRUCTIONS for the installation of Iroquois household electric refrigeration units, which might seem unnecessary because Iroquois machines are no longer manufactured, are nevertheless included because the information incorporated in the instructions will be of value to the man who is servicing or replacing parts on Iroquois units. The instructions for installing the Iroquois units are as follows:

After inspecting all parts, attach separator to the upper header of condenser. Two clamps are furnished for this purpose and care must be taken in fastening it so that the least possible strain is put on the header when tightening these clamps.

You must place it in a position where it will not interfere with the filling connection on the C-1 unit or the liquid line valve on the C-2 unit. These connections will be found on the right-hand side of the upper header. The tri-valve and connections on the separator must be on the right-hand side of the machine.

After the separator is fastened in place, put on the connecting tubes from the compressor discharge to the left-hand fitting on the separator and from the lubricant fitting on the compressor to the right-hand fitting on the separator. The tube from the center fitting on the separator to the condenser header must be left off until after the separator has been filled with lubricant.

#### Filling Connection for Lubricant

Next, remove the 1/4-in. cap on the filling connection at the top, right-hand side of the separator. Through this opening, pour one (1) pint of lubricant. This is the proper amount for all types of machines.

It may be necessary to warm the lubricant slightly when working in a cool place. If this has to be done, do not use an open flame if ethyl chloride is being handled in the same room.

Cans containing lubricant must be kept sealed. The lubricant should be kept clean and all funnels or tubes used in filling must be free from grit or dirt.

After filling the separator, replace the cap making sure that there is no possibility for leaks at this point. When this has been done, put on the connecting tube from the separator to the condenser.

Next, fasten the motor in place and make sure the pulleys are in line. Make a temporary electrical connection to the motor. See that all valves are closed and start motor. Allow it to run until about thirty (30) lbs. air pressure has built up on the inside of the machine. Stop the motor and allow the machine to stand for at least one (1) hour or longer.

Place a cap over the opening on the check valve so you may determine whether this valve is holding. If after the machine has stood for this length of time you find no drop in pressure or no leakage at the check valve, this machine is ready to be filled with the proper amount of refrigerant. Before filling the machine with refrigerant, vent off the test pressure.

Also remove the tube connecting the upper header of the condenser to the separator and cap the openings. (This is done to prevent lubricant from getting into the condenser should the machine be tipped when being handled.)

#### Filling Machine

Next, fill the lower header to the proper level with refrigerant. A tri-valve for determining this level will be found on the back header of the condenser. On the C-1 machines the refrigerant is put in through a filling connection on the right-hand side of the upper header. On the C-2 machines, it is put in through the pressure line valve which will also be found on the right-hand side of the upper header.

#### Filling Boiler

After the machine has been filled with refrigerant and all valves closed, the boiler which is to be used on this installation should also be filled. Before filling the boiler, however, remove the head and inspect the float valve and capillary tube arrangement.

Use small amount of oil on gasket and place it in original position before tightening cap screws. Pull cap screws down firmly.

Remove the 1/4-in. plug from the front of float chamber head and fill the boiler through the defrosting valve until a liquid flows out of this opening. Close the defrosting valve and tip the front of the boiler back far enough so that the float valve will drop into a position where it can be locked by the pin which is inserted in the end of the 1/4-in. plug. Screw plug in tight to prevent leakage.

#### Location of Compressor Unit

When installing a machine inspect the location carefully before setting it in place. Always select a position where there is good circulation of air, short runs of tubing, and as far as

possible from heaters, stoves, or open flames of any kind. The machine should stand solid and level in each direction. Under no conditions shall a machine be installed in a closet or other small unventilated room where an ethyl chloride leak might result in an inflammable mixture of air and ethyl chloride gas.

#### Installation of Cooling Unit

After placing the machine in position, remove the pin which is fastened to the end of the 1/4-in. plug which locks the float valve in the boiler. Replace the plug making sure there is no possibility for leaks at this point, and hang the boiler in the refrigerator. It should be hung level and in a position so as to allow free air circulation on all sides.

#### Installation of Tubing

Next, run the tubing from the boiler to the condenser unit. Care should be taken to see that all bends are neatly made and that the job presents a neat appearance when finished. The shoulders on the flares must not be hammered out too thin and should be carefully inspected. All filings should be removed from the inside of tubing before the joint is made.

The joints at the boiler should be made up first. When making the joints at the machine end, connect a dehydrator in the liquid line. Remove the caps on the connection on the upper header and center fitting on separator. Replace the connecting tube and open the liquid line valve. All extra tubing which remains after the job has been completed should be sealed at both ends.

#### Testing for Leaks

Next, open the defrosting valve slightly and allow the machine to run until an average pressure is indicated on the pressure gauge. Then close the defrosting valve tight and note the vacuum at which the machine stops. If this vacuum holds until you finish testing the high side, you can be sure that all the low side joints and the check valve are tight. While checking the low side with the vacuum on the lines, make sure that you test all of the high side joints. These are at the boiler, the connections on the high side valve, the cap over the stem on this valve, and the two joints on the connecting tube from the separator to the condenser.

#### How to Expel Air from System

Allow the machine to run about 10 minutes and vent the air from the condenser. It is very important that you turn off the electric switch, vent very slowly, and use rubber tubing to exhaust gas outside of building.

After running the machine for another period of 10 minutes vent again, and you may feel sure that all the air is out of the system. When a machine has run for a period long enough to pull the temperature down inside the boiler, the control should be set for the proper temperature. It should be adjusted so as to maintain a temperature of from 20 to 24° inside the freezing compartment.

### Servicing

When a service man is called upon to examine a machine, it will be because the machine is not operating properly or that the owner is not entirely satisfied. It is, therefore, very important that the service man know what constitutes correct operation and that he be able to determine promptly what part of the unit is failing and why.

#### To Replace Compressor

Close defrosting valve and open electric switch. Loosen cap at filling connection on separator and vent pressure down slowly. Vent until pressure gauge indicates zero pressure.

Remove gas line from separator to condenser and connecting tubes from compressor to separator, then drain out lubricant. Loosen set screw on compressor pulley. Take off suction line and pressure control tubes. Remove bolts holding compressor to base. It will now be free to be taken off the machine.

When placing new compressor on base, be sure it is lined up properly and then tighten bolts firmly. Connect up suction line pressure control tube and lubricant line from right-hand separator fitting to compressor. Refill separator with fresh charge of lubricant (1 pint). Put on compressor discharge connection and gas line separator to condenser, tighten set screw of compressor pulley and test for leaks. To test for leaks on low side connections, pull vacuum on suction line. Use oil on high side connections.

#### To Replace Pressure Control

Close defrosting valve and open electric switch. Remove connections from check valve to pressure control. Disconnect pressure control switch leads and take out bolt holding pressure control to base.

Set new pressure control in place and tighten bolts firmly. Replace connecting tube to check valve and reconnect switch leads. Test for leaks by pulling vacuum on suction line. After running the machine for about

five minutes, vent air from condenser. (Vent very slowly.)

#### To Replace Pressure Control Switch

Remove jaw on pressure control arm at switch, and pin at other end. Unscrew cover on switch. Disconnect leads and remove bolts which hold it in place.

In placing new switch in position, be sure it is at the same point where the old one had been placed. Connect leads and replace cover on switch. Fasten jaw and pin in place on pressure control arm. (If the new switch is not in the same position as the old one was, it will be necessary to readjust the pressure control for temperature.)

### Service Data on Other Refrigerators

This article is one of a series published by Electric Refrigeration News to give the service man help in servicing various makes of machines. Most of the makes described to date have been "orphan" machines on which service information is no longer readily available.

Service instructions on the following makes were published in these issues:

Abspure household.....	March 25, 1931
Majestic hermetic.....	Aug. 16, 1933
Allison.....	May 30 & June 6, 1934
Welsbach.....	June 13, 20 & 27, 1934
Rice household.....	July 4, 1934
Wayne household.....	July 11, 1934
Abspure com'l.....	July 18, 25 & Aug. 1, '34
Iceberg.....	Aug. 8, 1934
U. S. Hermetic.....	Aug. 15, 1934
Belding-Hall Electric.....	Aug. 22 & 29, 1934
Majestic standard.....	Sept. 12, 19 & 26, '34
Holmes household.....	Oct. 10, 17 & 24, 1934

#### To Replace Drive Shaft Seal

Proceed as in removing compressor. When the compressor has been taken off machine, remove cap and seal assembly. Clean out seal housing carefully and inspect bearing. Place bearing on new shaft and install new seal assembly. Always use a new gasket and be sure seal is centered properly. Tighten cap well and replace compressor on machine. Refill separator with fresh charge of lubricant as done when installing a new compressor.

#### To Replace Condenser

When removing a condenser, it is necessary to disconnect and completely discharge the machine. The machine must be dismantled and after the new condenser is installed, proceed as when connecting a new machine. (Positively do not attempt to solder an old condenser unless it has been thoroughly aired.)

#### To Replace Check Valve

Close defrosting valve and electric switch. Vent pressure in separator as when replacing compressor. When pressure gauge indicates zero, remove guide plug at top of check valve body and remove valve.

When valve has been replaced be sure that guide plug is turned down tight to prevent leakage. Tighten cap on filling connection on separator and test check valve by pulling vacuum on suction line. If check valve is holding properly, run machine for several minutes and then test for leaks around connections which were open when making repairs. The machine should be standing idle when testing for leaks in order to get a pressure on that part of the check valve body into which guide plug is inserted.

#### To Replace Float Valve

Close defrosting valve on boiler and liquid line valve on condenser. Disconnect suction and pressure line from boiler. Cap liquid line elbow and remove it from refrigerator.

Set boiler up on end in room where no open flames of any kind are burning and remove head. Replace or repair parts that are causing trouble. Use a new gasket, if necessary, and tighten cap screws firmly on head.

Refill boiler with refrigerant to proper level and hang it in refrigerator, and make up suction and pressure line joints. Put new flares on tubing if necessary. Open defrosting valve and liquid line valves and allow machine to run for several minutes. Close defrosting valve and test for leaks.

### Service Calls

#### I. Machine Refrigerates But Runs Continuously

Machine is set for a very low temperature.

Adjust to maintain from 20 to 24° in ice compartment on boiler.

Float valve leaking slightly.

This condition will cause the vacuum to drop back quickly at idle periods. Replace valve or complete float chamber head if necessary.

Machine does not have proper amount of refrigerant which is allow-

ing float valve to remain open at times.

Add refrigerant and locate leak through which gas was lost.

Pressure control switch stuck in one position.

Replace with new switch.

#### II. Machine Runs Continuously and Does Not Develop Proper Vacuum

Machine is low on refrigerant which allows float valve to remain open.

Locate leak through which gas was lost and add refrigerant.

Float valve leaking very badly.

Repair or replace if necessary.

Lubricant diluted with refrigerant.

This may be due to one of several reasons. The machine may have an overcharge of refrigerant. The float valve may be leaking badly or maintaining a liquid level which is so high as to allow refrigerant to overflow into the capillary tube well. The capillary tube well may leak at bottom. The machine may have been shut down for a time by pulling the electric switch and not closing the defrosting valve. The adjustment of the check valve in the condenser header may be too tight which will cause refrigerant to condense in separator.

If too much refrigerant is found in the machine, bring the level down to the proper point by venting from tri-valve on lower header until a spray instead of a steady stream is received. Vent slowly and use rubber tubing to exhaust gas outside of building.

If float valve is not holding or is maintaining a level which is too high, repair or replace and check liquid level carefully. If capillary tube leaks at bottom, repair or replace.

If electric switch has been turned off without closing the defrosting valve, run machine with defrosting valve closed until enough heat is generated in separator to drive the refrigerant from the oil. After oil clears up, compressor will pull proper vacuum and control will operate. Check oil supply and if proper amount is found, open defrosting valve and allow the machine to operate.

If check valve in upper header of condenser is adjusted too tight, it will be very noisy. Release spring tension on ball until it operates quietly. Under no condition, remove spring entirely. Should you find, after checking everything else carefully, that you still cannot pull the proper vacuum with the compressor, replace it with a new one.

#### III. Head Pressure Continues to Build Up in Condenser

This condition is caused by a leak in the low side of the system. Test for leaks by pulling vacuum on suction line. If vacuum does not hold, check all low side connections and pressure control. If vacuum holds, test with oil around guide plug on check valve and at thread where check valve screws into the compressor body. If no leak is found at this point, remove boiler from refrigerator and test by submerging it in tank of water. When testing boilers under water, cap opening on defrosting valve and elbow, and open valve.

#### IV. Head Pressure on Condenser Runs High With No Leaks on Low Side of System

This condition is due to an overcharge of refrigerant. Vent refrigerant from tri-valve on lower header until you receive a spray instead of a steady stream. Vent slowly and use rubber tubing to exhaust gas outside of building.

#### V. Boiler Defrosts (Head Pressure) Increases Slightly and Lubricant Becomes Diluted

This condition is caused by the float valve freezing up which is due to moisture in the system. Remove float valve, dry thoroughly, and leave dehydrator installed in liquid line for at least twenty-four (24) hours.

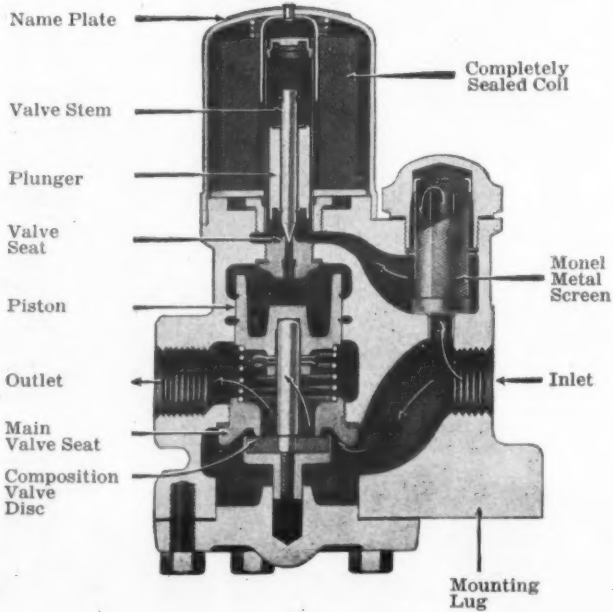
#### VI. Machine Starts and Stops at Very Short Intervals

Check valve leaking.

Vacuum gauge will indicate that pressure is getting past check valve into low side of system. Replace or repair valve and test for pressure leak around top of guide plug. Test for suction leaks by holding vacuum on low side of system with defrosting valve closed.

Pressure control switch standing center.

Vacuum gauge will not indicate full range of pressure control as the machine starts and stops. Replace switch, check boiler for temperature, and readjust control if necessary.



**70-N** refrigerant control valve as shown above is operated upon the by-pass principle. The solenoid opens up the small by-pass allowing the refrigerant to force down the piston which in turn opens the main valve. Operation is simple and fast. By-pass valve has the famous A-P impact type plunger—will open under high pressure. Write for Bulletin 402.

**AUTOMATIC PRODUCTS COMPANY**  
121 N. Broadway Milwaukee, Wis.

**BRUNNER**

Send for the New  
**REFRIGERATION CATALOG**

Eight Models of Compressors  
Forty-one Models of Highsides  
from 1/6 H. P. to 15 H. P.  
**BRUNNER MANUFACTURING CO.**  
UTICA, N. Y.

## ENGINEERING

### Ashbaugh Describes Development Of New Westinghouse

By J. H. Ashbaugh, Manager, Refrigeration Engineering  
Westinghouse Electric & Mfg. Co., East Springfield, Mass.

THE design of the new Westinghouse streamline refrigerators is not the result of any one man's ideas or activity, but is the combined effort of the entire engineering department, working together towards a common goal. The streamline effect and general construction is the result of several years of effort.

Let us first look at the external appearance of the cabinet. The artist who designed it—R. E. Kruck, says: "One of the main problems to be overcome in the design of a refrigerator cabinet is to coordinate into one entirely the various forms and lines which comprise a cabinet. In order to achieve this end, the transition from the vertical to the horizontal was accomplished by the use of graceful curves at the top and also at the bottom, so that at no time is the eye disturbed by a sudden change in direction of line.

#### Gradual Transition of Lines

"The eye normally races up and down any vertical line, but with these graceful curves at the top and bottom, the eye is gradually and easily converted from a vertical motion to the horizontal motion of the cabinet top. The hardware was made to correspond to these lines.

"The creation of a well-proportioned cabinet, consistent in form and line, and simple in construction will result in an inherent style and consequent attractiveness which will remain in favor as long as the function of that cabinet remains intact. It will be noted that the cabinet has a simplicity of design, motivated primarily by the functional and utilitarian beauty organized in such a way as to create a cabinet of distinctive appearance and lasting design."

Mr. Kruck made about 12 different designs before he was satisfied with the results.

#### Revolving Shelf

The man responsible for the entire mechanical construction of the cabinet and its features is G. F. Forsthoefel. Many months ago he conceived the idea of building a cabinet in which all the shelves rotated in order to make them more accessible to the user.

The revolving shelf was not perfected, however, until cabinet after cabinet had been built with different shelf arrangements, different methods of construction, and tested for deflection with different weights of food load. A final sample was built and it was actually tested in his home to be sure that there was not some unforeseen thing overlooked.

#### Strength in Cross-Member

The hidden strength of this rotary shelf is in the heavy cross member, which is unseen, back of the food compartment which carries the entire food load. This is cantilevered by the arm supporting the rotary shelf.

The fundamental of any cabinet design is that the insulation be sealed against moisture. Particular attention was paid to this feature in the design of the 1935 Westinghouse cabinet.

Field experience indicated that the wrapper sheet construction was fundamentally sound. It permits making a cabinet in virtually one piece of sheet steel, then welding it together. It was on this premise that this design was made.

#### Testing Hardware

Cabinet hardware, and particularly the latch, is of paramount importance, and the standards set up by the engineering department were exceedingly rigid. The door must be easy to open and easy to close. The latch must give a perfect door seal, it must be easy to adjust, and it must be removable without dismantling the cabinet.

Testing of hardware is always quite a problem, and in order to adequately test this hardware it was necessary to first develop a machine which would automatically and quickly reproduce actual operating conditions. This machine opens the door exactly like a person would open it, and then slams it closed in exactly the same manner.

Sample after sample of hardware was tested on this machine, until finally a design was selected which would stand upwards of 300,000 operations. In addition to this severe test, 25 samples were built and actually installed on new cabinets long before production ever started, and again thoroughly tested.

Another function of the cabinet and its insulation is to prevent heat infiltration. The amount of heat which

does filter into a cabinet is known as the heat leakage.

#### Measuring Heat Leakage

The usual method of testing a cabinet for heat leakage is to put heaters in the cabinet, raise its temperature above that of the surrounding air, and then measure the amount of heat which is required to maintain a given temperature differential.

It is obvious that such a method works just the opposite from how a refrigerator actually works in service. In order to duplicate conditions as they exist when a refrigerator is operating, H. D. White, under Mr. Forsthoefel's direction, developed a new method of measuring the amount of heat loss in a cabinet.

This new method consists of measuring the quantity of liquid refrigerant evaporated in the evaporator, and when this quantity of liquid is known, it is quite easy to determine the actual B.t.u.'s lost in a given cabinet.

#### Users Furnish New Ideas

It is said of the automotive industry that many of the noteworthy advancements and inventions come from owners of automobiles, and so it is with refrigeration. Many of the features in refrigerators are the ideas of individual owners who own patents and then sell them to refrigerator manufacturers.

Over 18 months ago a device was submitted to the Westinghouse company for ejecting ice cubes. Manufacturing rights were obtained for this tray. After this there ensued long months of work in developing and perfecting the device.

In one week-end alone, over 10,000 ice cubes were made, and during the complete development period of the tray, approximately 80,000 to 100,000 ice cubes were made.

#### Operation of Cube Ejector

The principle of this ice tray is that the elevator bar operating through the two levers first frees the cubes from the tray proper, the second motion of the cam produces a downward force on the grid and the elevator bar then forces the cubes outward, and as these are tapered it immediately frees the cubes. It is so designed that almost an infinitesimal movement causes the freeing of the cubes from the grid.

There are two improvements in the 1935 Westinghouse condensing unit to which I should like to call attention.

One is a new pressed steel muffler, which has been designed to give quieter operation with less parts, thus making for more reliability. Two mufflers are used on the intake side of the cylinder, and one on the exhaust side.

I should like to call particular attention to the fact that a screen is used just before the gas enters the cylinder, thus insuring against foreign particles entering the cylinder. This screen is in addition to two others which have always been used in the unit—one is in the float valve, and the other is between the compressor housing and the evaporator.

#### Changes in Fan Motor

Minor modifications and improvements have been made in the fan motor, so that the amount of oil circulated through this motor is increased, thus insuring more positive lubrication.

It might be of interest to know the thoroughness with which the fan motor has been tested. The arch enemy of any piece of rotating machinery is dirt and foreign particles entering through the air gap or the oiling system, causing improper lubrication.

In order to test this fan, the contents of many vacuum sweeper bags were collected and placed in a small room. The fans on test were then run in this small room, violently circulating dust to every nook and corner and completely covering the motors on test. Some of the motors were run continuously, others were run part of the time, and some were stationary part of the time.

After these had been running successfully for several weeks, and no signs of failure were indicated, it was felt that possibly finer dirt might seep into the motor, fouling the oiling system. Therefore a sack of flour was distributed among the vacuum sweeper dirt, and the test was continued for many weeks. No trouble of any kind developed.

In designing a kitchen, we have found that many architects provide an alcove in which to place a refrig-

erator. Architects, however, do not realize that a refrigerator is merely a device which pumps heat from the cabinet to the outside air, and in order to dissipate this heat it is necessary that a certain quantity of air be circulated over the unit pumping the heat out of the cabinet. If this air will not circulate, or is restricted, the refrigerator compressor cannot therefore do its job and pump out sufficient heat.

#### Air-Circulating System

In order to improve this condition, the engineering department started, in the early part of the year, to develop a method whereby the refrigerator would be less susceptible to such limitations. The result of this work by Mr. Eaker, under Mr. W. B. Anderson's direction, was a new air baffle and air-circulating system on the 1935 Westinghouse refrigerator.

This was not obtained until after about 30 different samples were designed and tested in alcoves built around the refrigerator. Mr. Eaker finally designed this, working on the principle of the Maxim Silencer.

#### Dissipates Heated Air

Air is drawn in through the intake baffle from the bottom of the cabinet, and a canvas duct connects this baffle to the condenser. The object of the canvas duct is to stop the transmission of any vibration from the condenser to the cabinet proper. The air then circulates through the condenser over the compressor and out through the chutes.

It rises, when it has been exhausted from the cabinet, due to its heat. The heat of the condenser and motor is thus dissipated to the surrounding air. The chute through which the air passes offers no restriction to the air. It is made of sound-absorbing material which will absorb noise just as the Maxim Silencer silences the noise of a rifle without interfering with the

passage of the bullet.

It is not possible in an article as short as this to explain all the details of the tests and the work done on every part of this refrigerator, but the work of M. Kalischer, who is responsible for the technical development, and who is continually working on advanced ideas and means for accomplishing new developments, should be lauded.

His assignment is an "eye to the future," and his work consists of such subjects as research in refrigeration, design, lubrication, and food preservation.

Layout and detail drawings are necessary before a new line can be put into production. T. A. Buckley is responsible for all of these drawings and information on both the units and cabinets. In order to bring out the new streamline cabinets it was necessary for approximately 1,000 drawings to be made and thoroughly checked before releasing information to the tool department for making tools.

### Kansas City Dealers Hear Bonfig by Phone

KANSAS CITY—Approximately 250 dealers attended the meeting held at the President hotel recently by the Midwest Grunow Co., distributor for Grunow refrigerators and radios, to introduce the new Grunow line.

E. J. Goetze, president of the distributor company, was chairman of the meeting. Homer Kunkler, assistant sales manager of the General Household Utilities Co., discussed the company's advertising and sales promotion plans for this year.

Dealers heard a talk from Philadelphia by H. C. Bonfig, vice president and sales manager of the General Household Utilities Co., the speech being made via long distance telephone with the help of amplifying and loudspeaker equipment.

### Home Demonstration Set Used to Sell Penn Temtrol

DES MOINES—New sales help put out by the Penn Electric Switch Co. of this city to aid salesmen of the Penn Temtrol heat regulator is a "home demonstration set," consisting of a "Day-Nite Temtrol," Penn "Timetrol," and Penn transformer.

The controls are applicable to every type of heating system, and may be connected up in a few minutes without removing or damaging the control equipment already in the home. The householder may make a comparative test during the trial operating period.

The "Temtrol" is supplied with an outside adjuster so that the prospect may shorten or lengthen burner operation to meet individual requirements of his home.

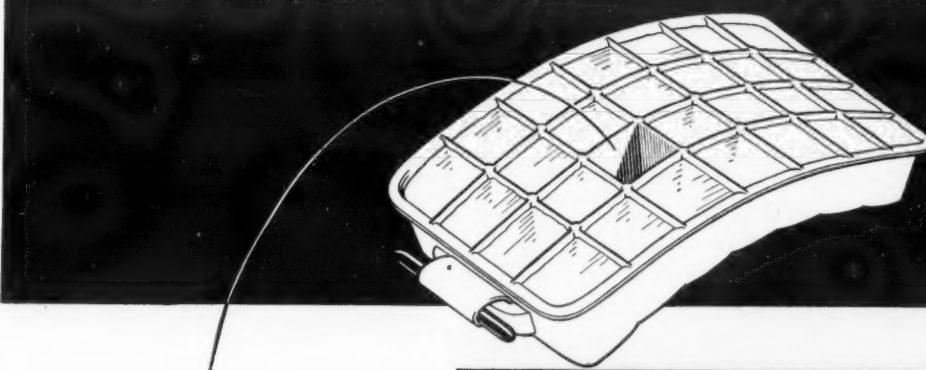
The controls are mounted on a pyramid type base structure, about 4 ft. high. For carrying, it folds together like a small sample case and is provided with a strap handle.

### 15,000 Inquiries Received in January for G-E Workshop

SCHENECTADY—Inquiries on the new General Electric Workshop totaled more than 15,000 during January, pouring into the home office at the rate of 400 per day, declares R. W. Shelton, manager of the workshop division.

Information concerning the new machine, says Mr. Shelton, was requested principally by adults. The greatest volume of sales has been to executives—men who find rest and relaxation in constructing things with the workshop during leisure hours.

## A TRAY FULL OF TRICKS!



### "COLD FACTS" No. 1

Many a hard-to-sell customer is won over by flexible rubber trays and grids! INSIST that all models of the refrigerator you sell come factory-equipped. Write to your manufacturer or direct to us. The Inland Manufacturing Co., Dayton, Ohio.



Prospect: I can't quite make up my mind between this model and the — refrigerator.

Salesman: This refrigerator comes equipped with flexible rubber trays and grids.

Prospect: Well, I guess that settles it. Hubby insists on rubber trays.

**Flexible Rubber Trays and Grids**  
WILL HELP SELL  
**A MILLION AND A HALF REFRIGERATORS**  
IN 1935!

## ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office  
Copyright, 1935, by Business News Publishing Co.  
Published Every Week by  
BUSINESS NEWS PUBLISHING CO.  
5229 Cass Ave., Detroit, Mich. Telephone Columbia 4242.  
Production Dept., 550 Maccabees Bldg., Columbia 4245.

Subscription Rates—U. S. and Possessions and all countries in the Pan-American Postal Union: \$3.00 per year; 2 years for \$5.00. Canada: \$6.00 per year (due to special tariff). All Other Countries: \$5.00 per year (U. S. Money). (See "Buyers Guide" columns for combination rates with the 1935 REFRIGERATION DIRECTORY AND MARKET DATA BOOK.)

F. M. COCKRELL, *Publisher*

GEORGE F. TAUBENECK, *Editor*  
PHIL B. REDEKER, *Managing Editor*  
A. J. CUTTING, *Statistical Editor*  
FRANCES McNAMARA, *Assistant Editor*  
THEODORE T. QUINN, *Staff Writer*

GEORGE N. CONGDON, *Business Manager*  
JOHN R. ADAMS, *Production Manager*  
JEAN H. ADAMS, *Subscription Manager*  
HELEN K. GILMORE, *Assistant Adv. Mgr.*

Member, Audit Bureau of Circulations  
Member, Associated Business Papers  
Member, Periodical Publishers Institute

VOL. 14, No. 9, SERIAL NO. 310, FEBRUARY 27, 1935

## TVA Rebuked

WHEN Judge W. I. Grubb of the United States District Court in Birmingham, Alabama, declared that the Tennessee Valley Authority was without the legal right to sell surplus power generated by its plants at Muscle Shoals and elsewhere on the Tennessee river (see story on page 1 of this issue), the ruthless progress of this "great social and humanitarian experiment" was given a long overdue derailment.

Forney Johnston, counsel for the group of preferred shareholders of the Alabama Power Co. who brought the suit, called the hydroelectric project at the Wilson dam "the Rubicon," and it may have been that had TVA won its suit in Judge Grubb's court, the Roosevelt Administration might have crossed the Rubicon on a vandalistic march toward socialization of industry and business. Possibly this statement overvalues the importance of the case; but one decision leads to another, and there is no doubt in any sane observer's mind but that the whole TVA project is a gigantic manifestation of Socialism. It puts the government in these businesses: public utilities, manufacturing, distribution, and retailing—all in direct competition with private business and business men.

### Keep Government Out of Business

That unless TVA is able to sell its electricity, through what amounts to virtual seizure of already existent power transmission lines, the electricity may go to waste, is beside the point. As Judge Grubb himself put it:

"If there was a question of doing an illegal business or having a product go to waste, as I see it, the government would have to let the product go to waste."

Nor should the grandiose schemes of social betterment for the somewhat backward population groups which reside in certain portions of the Tennessee Valley—groups which, not without a measure of justification, resent their forced subjection to this "uplift," particularly when it means giving up their ancestral homes—have any bearing on the case. As a matter of fact, James L. Fly, chief counsel for the TVA, himself pointed out that "the plans, purposes, conjectures, and wild hopes of the Tennessee Valley Authority are not before the court."

### Wild Dream of Empire in TVA Area

Judge Grubb stated the question—and its only proper answer—succinctly when he said:

"There is a difference between the government going into the daily business of selling and of leasing. The daily business might be a benevolent dictatorship on the part of the government, but I have never been able to bring myself to see that the United States had any right to go into a retail business."

The "wild dream" of empire, the Utopian or Periclean state envisioned by Director Arthur Morgan and his associates, has blinded many of our popular magazines and even a few newspapers (which, as professional fact-finders, should know better) to the real issues of the

case. Perhaps Judge Grubb's blunt decision will serve as a morning-after glass of tomato juice for these intoxicated commentators. To those who have viewed the matter soberly, this judicial decision comes as a bromo-seltzer for the headache induced by TVA activities.

Fundamental reason for the TVA, as stated by President Roosevelt, is that of providing a "yardstick" for measuring existing rates for electricity—which he feels certain are too high. This idea seemed quite acceptable to the country when it was first propounded; but the high-handed and utterly ruthless methods pursued by David E. Lilienthal and his associates in establishing this yardstick made the idea turn sour.

How the EH&FA, the TVA agency formed to secure distribution of TVA power, bullied and threatened manufacturers of electrical appliances into marketing their products at unjustifiably low prices—with the resulting havoc wreaked among retailers and wholesalers in the Tennessee Valley—has been told in *ELECTRIC REFRIGERATION NEWS* before. The story of the freezing out of stockholders in the acquisition of power lines is also well known. Mr. Lilienthal's sharp bargaining has thrown discredit on all the humanitarian aspects of the scheme.

But the "yardstick" idea is itself fallacious. It is an admission, of course, that governmental regulation of public utilities by commission has been a failure. But it presupposes that a political machine can run a business better than men who were brought up in it. And it also depends upon acceptance of the proposition that figures don't lie.

### What Would the 'Yardstick' Prove?

A Treasury actuary named McCoy (now deceased) was once discovered by a congressional committee to have furnished the Republicans with facts and figures for their tax bill, while supplying Democrats with opposing facts and figures for their totally different tax bill. When cross-examined, McCoy testified in all seriousness that he could "make figures prove almost anything."

Just what TVA's power "yardstick" will prove when it has been obtained is open to honest doubt. In the first place, the government is writing off huge sums for development of its generating facilities, and charging them to flood control, national defense, and the like. In the second place, the entire country is being taxed for this development of one region. In the third place, its agencies are trying to gain their ends by a combination of high-handed methods and ballyhoo which probably would not be tolerated were they followed by private concerns. And it all gets down, in the end, to a matter of bookkeeping, of "making figures prove almost anything."

To the observer in England or France, the whole TVA project must seem highly incongruous when considered along with the rest of the Administration's theories. Farmers are paid cash for plowing under every third row, for slaughtering hogs. Manufacturers are promised temporary respite from anti-trust laws in return for higher-cost "spread the work" production programs. All production is to be curtailed and controlled. But is there a suggestion that every third electrical generating plant be plowed under? On the contrary, the government undertakes to throw vast quantities of kilowatts onto a market already well supplied—thereby disrupting a delicately balanced system of distribution which includes thousands of small business men among those affected, as well as the harried and harassed power tycoons whose scalps Roosevelt is avowedly out to get.

### Not Advocating High Electrical Rates

This paper holds no brief for high electrical rates. In many sections of the country rates do seem to be too high. Moreover, lower rates should help sell more appliances. But it does appear that in its eagerness to force rate reductions the Administration, is promoting some cockeyed ideas at the expense—and even to the ruination—of the most necessary and most democratic pillars of our industrial society, the so-called small business men and small investors.

## LETTERS

### San Diego's Big Year

Bureau of Radio and Electrical Appliances of San Diego County  
600 Electric Bldg., San Diego, Calif.  
Editor:

I wanted to observe that the recent loss of three important staff members has surely proved no handicap to the progress of the News.

Such spirit as has been shown by the management in this difficult situation is instantly recognized by the average reader, and I feel sure that even a finer respect than before will be developed for your indispensable publication.

We in Southern California are confidently looking forward to a refrigeration year far and away more successful than the one just closed, satisfactory as it was.

Undoubtedly you are aware of the fact that San Diego is to stage a great Exposition this year. Some difficulty may have been experienced in getting certain of our refrigeration giants to realize this, but fine progress is being made, and when the gates open May 29 most of the leaders should be represented.

We really have a 10 million dollar affair so totally different from other expositions that comparison becomes difficult. Using the 1,400 acre Balboa Park which has been developed over a period of 20 years, we had much to go on.

The marvelous trees alone provide a setting impossible to duplicate artificially. An outdoor organ, representing a value of a million dollars is another unusual feature.

Thousands of men are laboring out there each day to complete the buildings of the exposition group, and I'm sure everything will be in readiness at the appointed time.

J. CLARK CHAMBERLAIN.

### Campaign on Architects?

California Refrigerator Co.  
1077 Mission St.  
San Francisco, Calif.

Editor:

Many refrigerator sales are lost or a smaller mechanical refrigerator is used because, in the designing of homes and apartments, the architect or builder does not leave the proper space for a single unit mechanical refrigerator.

The wall sockets to plug the refrigerator in is often forgotten in designing the home. There should be a socket where the refrigerator is to be stood from 12 to 20 in. from the floor. By having this installed when the home is built it creates more electrical business and it removes the objection from the prospective refrigerator customer that there is no place to connect up the refrigerator.

When a smaller refrigerator has to be used at times, the manufacturer and dealer lose the increased profit of a larger refrigerator which could be sold. The power company is also a loser because the smaller refrigerator uses less power than the larger one.

I suggest, therefore, that a campaign among architects and designers be started to correct the above facts. Your magazine, I am sure, is the proper place to start this movement, and I am sure the entire industry will appreciate your efforts along these lines.

CLARENCE F. PRATT,  
President.

### In re F. C. Lovelock

F. C. Lovelock, Ltd.  
235 Clarence St., Sydney, Australia  
Editor:

In a recent issue of *ELECTRIC REFRIGERATION NEWS* you recorded the death of F. C. Lovelock, president of this company. The passing of Mr. Lovelock, with whom you were on such friendly terms through your correspondence, followed upon an operation which he underwent in an endeavor to overcome the chronic ill health from which he had been suffering during the last 18 months.

For the past six months he had been entirely unable to devote more than a small portion of his time to the business, owing to his sickness, and therefore decided, following the advice of specialists, to undergo an operation for gall bladder to remove the trouble at its source.

The operation was successful; but Mr. Lovelock suffered a relapse some two days afterwards, and having no stamina, doctors could not do anything for him.

You can understand that this is a very sad thing for the staff of this business, and also for Mrs. Lovelock and his three children.

It is also a very great loss to the Australian refrigeration industry, for Mr. Lovelock was a man who was known and liked by everybody in the game over the whole of this country.

He had his fingers on the pulse of the local industry, and has been responsible for giving a helping hand to every salesman and every service

engineer and most manufacturing concerns during the past six years.

You probably know that Mr. Lovelock was sales manager for Frigidaire when they first started here, and built up a phenomenal business during their first two seasons.

After an increase in tariff there came this depression, and so Mr. Lovelock decided to start his own business; and found that with the volume of Australian-manufactured machines growing bigger and bigger, there was a wonderful field for an accessory supply business operating under the right principles.

Owing to his very forceful personality, he rapidly became known to everybody in the game, and now with the representation to Melchior, Armstrong, Dessau & Co., Bishop & Babcock, together with two or three similar English concerns, the business handles the essential imports for almost every refrigerator manufacturing concern in this country.

You, yourself, will understand Mr. Lovelock's unique personality by reason of the friendship which he established with you merely through his correspondence, and will sympathize with us in the very serious loss which we have sustained.

The firm, however, will be carrying on along the lines on which Mr. Lovelock established the business, and we believe that it will continue to grow at the rate at which it has already done under Mr. Lovelock's guidance.

This being so, we trust that the cordial relationships which have always existed between us will be maintained and that we can count on your ready assistance as before.

J. H. LIDDLE,  
Sales Engineer.

### Industry History

Association of  
Edison Illuminating Companies  
80th St. and East End Ave.  
New York City

Editor:

To signalize its fiftieth anniversary this association is planning to prepare and issue a history of the electrical industry. On the subject of refrigeration we have a reprint of a Franklin Institute paper of 1928 by A. R. Stevenson, Jr., of the General Electric Co.

This is a starter. Can you indicate where we might turn for authoritative material as to the origin and growth of electric refrigeration, or would you be willing to supply material of this nature which might be worked into the book by an editor? We want a suitable account in text, illustrated, if desired, and we want to stress the public service character and the social significance as well as the engineering features.

PRESTON S. MILLER, Secretary.

Answer: Your plan to issue a history of the electrical industry on the occasion of the fiftieth anniversary of the Association of Edison Illuminating Companies sounds most interesting.

For historical material on the electric refrigeration industry we can think of no better source than the files of *ELECTRIC REFRIGERATION NEWS*, which has faithfully recorded the progress of this remarkable branch of the electrical industry since September, 1926. I trust you have a complete file in your office. If not, bound volumes may be had at the price of \$3.00 a volume (each volume contains all issues of *ELECTRIC REFRIGERATION NEWS* issued during a period of four months).

The Sept. 12, 1928, issue contains considerable historical material on the origins and early development of electrical refrigeration, and the Sept. 5, 1934, issue contains a Digest of the Corporate History of the Electric Refrigeration Industry—which includes a wealth of material on the pioneers of the industry, and an extraordinarily complete record of the manufacturers which are not now in the business.

### An Invitation

E. O. Cone Co.  
General Electric  
P. O. Box 1532, El Paso, Tex.

Editor:

For some time I have thought of writing to you to tell you how much I enjoy reading your personal column and remarks on Who Is Who in the Industry. I hope you keep the good work up and better still pay a visit to the Great Southwest.

J. E. VAUGHAN,  
Manager.

"Enclosed is a check in the amount of \$3 for which please send us a year's subscription to *ELECTRIC REFRIGERATION NEWS*."

"We neglected to renew our subscription when it ran out and we have certainly missed the magazine."  
—H. G. JENNESS, Manager, The Radio Shop, 335 West Eighth St., Dubuque, Iowa.

"It might interest you to know that we look forward to every issue of your paper as it certainly keeps us in touch with all the progress made in the refrigeration field."  
—H. M. MILNE, Household Appliances, Ltd., 1405 Drummond St., Montreal, Quebec, Can.

## Factory Squadrons Dramatize 1935 G-E Plans to Dealers

(Concluded from Page 1, Column 4)  
Co., St. Louis, who took part in the program there included L. D. James, head of the distributorship; R. L. Hughes, vice president; W. L. Burton, secretary and sales manager; and Clay L. Miller, sales promotion manager.

Approximately 60 dealers and salesmen attended the El Paso, Tex., convention, held by E. O. Cone Co. Other members of the distributor's staff who took part in the meeting were J. E. Vaughan, D. S. Pack, C. T. Sullenberger, Reed Wipprecht, O. S. Patterson, and A. B. Baldwin.

### District Managers Help

District managers who accompanied the Cleveland convention troupes through their territories and took part in the meetings were: T. B. Allen, southeastern district; R. H. Ferguson, central district; F. T. Harvey, lake states district; O. D. Miller, southwestern district; B. C. Ritter, Rocky Mountain district; G. J. Ruck, Pacific Coast district; W. P. Smith, Atlantic Coast district; J. M. Walker, northeastern district; A. E. Freshman, Tennessee district.

P. B. Zimmerman, manager, and A. M. Sweeney, sales manager of the G-E specialty appliance sales department, were spectators at the convention held by Electrical Housekeeping, Inc., in Hotel Statler, Cleveland, and attended by 375 dealers and salesmen.

Arrangements for the Cleveland convention were in charge of E. J. Leicht, Electrical Housekeeping's sales promotion manager. Chief speaker at the meeting was D. P. Dinwoodie, head of the distributorship.

### 3 Factory Troupes in Charge of Meetings

CLEVELAND — General Electric's 1935 line of electric refrigerators and other home appliances is being presented to dealers and the public in a series of "On the Top" conventions by three factory and professional troupes in various parts of the country.

G. D. Kobick, manager of the G-E apartment house division, is in charge of the western troupe; R. C. Cameron, assistant sales manager in charge of department store activity, is leading the southern troupe, and Paul H. Dow, assistant to the sales manager of the specialty appliance department, heads the troupe touring eastern cities.

#### Troupe Personnel

Advance men for the groups are C. O. Hamlin, Howard E. May, and M. D. Grow.

In Mr. Kobick's troupe are E. H. Norling, W. D. McKelvey, C. C. Barnes, of the G-E merchandising department, Bridgeport, Conn.; J. A. Foley, of General Electric Contracts Corp.; J. W. Laws, R. E. Brogan, R.

W. Watts, Miss Florence Thompson, and Miss Catherine Cast.

Mr. Cameron's troupe includes Jack Bryan, Joe W. Long, F. Chandler, Arthur Woods, of G-E Contracts Corp.; R. A. Dute, Roy Weldon, of the merchandise department; E. C. Dvorak, Miss Margaret O'Connor, and Miss Katherine Robertson.

Mr. Dow's troupe has J. M. Walker, G. E. Drollinger, A. O. Anderson, John Klenke, G-E Contracts Corp.; C. B. Robbins, W. D. Galpin, manager of the retail division; H. O. Pritchard, Miss Thelma Kelly, and Miss Virginia Dillon.

#### Presentation of Features

Clear presentation of features of G-E's 1935 products, the economic necessity of the "balanced job," (selling of appliances), and the need of sales training are the three points made in the presentation at these conventions.

The presentation opens with a prologue in verse, descriptive of a mural which depicts the electrical industry and General Electric's relation to that industry. After the showing of the mural, a crowd is seen on the stage waiting before a distributor's place of business to view a show of new G-E products. A reporter, circulating among the crowd, queries people regarding opinions on the statement "training for a job is the basis of success."

The representative of the General Electric Co. introduces the distributor, who welcomes the crowd, has the curtains taken from his windows, and gives a detailed description of the G-E refrigerator line to the crowd as it enters the store.

Commentators who weave in and out of the presentation include the Inquiring Reporter, a doctor, and Father Time, the figure feature in G-E advertising.

Present in the cast is a G-E salesman who embodies all the faults of a salesman who disregards the necessity of training. Father Time becomes interested in his case. They meet at the corner of Right and Wrong streets. The salesman tries Wrong street, and a series of skits show the wrong way of approach and demonstrate the ineffectiveness of the untrained man.

#### Salesman Reforms

Eventually, the salesman returns to the corner, talks with Father Time, and tries Right street. He studies through the medium of the Visualizer and the La Salle training course and conforms to various approved methods of sales.

He sells a refrigerator. Six months pass, he returns to make a repetition sale and gives a demonstration of the working of the G-E Contracts Corp., when he sells a range. Later he sells a dishwasher.

A competitor salesman, who has been slowly becoming discouraged, finally decides it is impossible to have only a single product to sell to make a satisfactory living for himself. Salesmen doing a balanced job are straightening out the sagging points in their sales curves and are finding year-round profitable opportunities through the balanced job.

Father Time tells the competitor salesman there is an opportunity in the Bridgeport line which is to be demonstrated soon. He lays his case before the Bridgeport representative and lands the job.

The show also includes the building of a symbolical house to represent the structure of the General Electric organization. During the erection of the skeleton work, a G-E representative enters and gives a talk on the G-E organization and concludes with the reiteration of the need for trained men to sell products which have been manufactured by trained men and which in turn were conceived by trained men.

A talk on nutrition, an argument for electric cookery, is given by the doctor. Presentation of the G-E 1935 range line is given here.

The presentation is concluded with individual introduction of the actors in the show.

Conventions still to be held include: Western troupe: B. K. Sweeney, Inc., Denver, Feb. 27, C. W. Hulbert, convention manager; Electrical Housekeeping, Inc., Omaha, March 1, P. E. Ervin, convention manager; G-E Supply Corp., Des Moines, March 4, P. H. Sawyer, convention manager; Crescent Electric Supply Co., Moline, Ill., March 5, M. B. Mendenhall, convention manager.

Joint meeting of O. F. Stuefer Co., Minneapolis and G-E Supply Corp., St. Paul, March 7, A. S. Dunning, convention manager; E. H. Schaefer Corp., Milwaukee, March 8, E. Zabers, convention manager.

Southern troupe: H. G. Bogart Co., Toledo, Feb. 28, H. G. Bogart, Jr., convention manager.

Eastern troupe: Modern Home Utilities, Inc., Waterbury, Feb. 27, L. L. Stacy, convention manager; W. L.

Thompson, Inc., Boston, Feb. 28, Gordon Craig, convention manager; A. Wayne Merriam, Inc., Schenectady, March 4, P. C. Fyler, convention manager.

Gould-Farmer Co., Syracuse, March 5, A. P. Rafferty, convention manager; Frank W. Wolf, Inc., Buffalo, March 7, Walter Mullett, convention manager; R. Cooper, Jr., Inc., Chicago, March 8, Sam Nides, convention manager.

### Detroit Engineers Hear About Frozen Elephant

(Concluded from Page 1, Column 2)

one point, however. Prof. Hussey showed slides of an ancestor of present-day elephants which had fallen into a Siberian crevasse 25,000 years ago. It had been preserved in natural ice all that time, and was excavated in perfect condition.

After 25,000 years in cold storage, the meat of this elephant was entirely edible, according to Prof. Hussey, and was enjoyed by members of the expedition, as well as their dogs. Incredible as it may seem, unmastered food was found in this frozen prehistoric elephant's mouth, and undigested food in his stomach—still preserved after 250 centuries.

Incidentally, Prof. Hussey disclosed that half the ivory in use today has come from prehistoric elephants which have been unearthed in Siberia.

Preceding the lecture there was a small dinner for Detroit A.S.R.E. members, presided over by John Wyllie, Temprite products sales manager. Others who attended included Tom Pendergast of Universal Cooler, P. D. Parker and B. E. Tiffany of Kelvinator, Dan Wile of Detroit Lubricator, C. E. Terry and P. F. Leslie of Temprite, Inventor Frank West, Prof. Hugh Keeler of the University of Michigan, and F. M. Cockrell and George F. Taubeneck of ELECTRIC REFRIGERATION NEWS.

### Temprite Feature Series (No. 1)

## INSTANTANEOUS COOLING

TEMPRITE exclusive principle of instantaneous cooling is accomplished by submerging the beer, beverage or water coils directly in liquid refrigerant and is the most efficient and economical method of heat transfer known to science.



#### Refrigeration Distributors

Temprite Beer, Water and Beverage Coolers have achieved outstanding success in the field. We shall be glad to furnish you with complete information.

### TEMPRITE PRODUCTS CORPORATION

(Formerly Liquid Cooler Corp.)

"Originators of Instantaneous Liquid Cooling Devices"

Detroit

Michigan

Dependability in a product is never the result of chance. It is a matter of design and building. To be familiar with Universal Cooler's manufacturing policies makes it easy to understand why Universal Cooler electric refrigeration units have won such high recognition among the trade and the public as products of dependable performance.



### UNIVERSAL COOLER CORPORATION

DETROIT, MICHIGAN

BRANTFORD, ONTARIO

MANUFACTURERS OF A COMPLETE LINE OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT

### Steps Up



WALTER L. JEFFREY

### Jeffrey Promoted in Kelvinator Dept.

DETROIT—Walter L. Jeffrey, for the past five years a member of the sales promotion department of Kelvinator Corp., has been appointed manager of the newly formed operations division of the company's advertising and sales promotion department.

Vance C. Woodcox, director of advertising and sales promotion, declares that the new division will assume full responsibility for all sales promotion creative work, publicity and sales education activities, and promotional details.

Mr. Jeffrey formerly was manager of campaigns and contests for Kelvinator and also headed up all public utility sales promotion.

## AIR CONDITIONING

### Installation of Air Circulating & Conditioning System Renovates Building

BOSTON — An out-moded building here, vacant for some years, has been converted into an up-to-date apartment dwelling through remodeling and the installation of winter air-conditioning and summer circulation equipment.

The four-story building, located at 406 Beacon street, had been idle for three years, when the owners decided to remodel and air condition it. The move proved profitable, for apartment seekers, learning of the plans, rented suites before the work was actually started.

Air-conditioning system was engineered and installed by Curtis & Brock, Inc., of Boston. The old heating equipment was removed, and a C & B air-conditioning system installed in its place. This includes a boiler-burner unit, warm air conditioner, and an automatic domestic hot water supply system.

Provision has been made for the addition of cooling at a later date. At present, the system provides automatic warm air and steam heat, humidification, air cleaning, circulation, and summer ventilation.

The building had been heated by warm air, and the new ducts were located in the same positions as the old. These lead into each apartment and are equipped with volume damper regulators in the basement, enabling the superintendent to supply each apartment with the amount of heat desired, insuring comfort for individual tenants.

This method was chosen in contrast to the automatic setting of room temperatures for all tenants by means of a thermostat, located in the hall.

The system is of the two-unit type. One is a boiler-burner unit, that supplies steam for the radiator in the warm air conditioner, radiators in kitchens and baths, and hot water for the entire building. The other is the air conditioner with its fan, water spray, filters, etc.

Since the building was located in the direct current district, it was necessary to install a rotary-converter.

Cycle of operation for the air conditioner is as follows: Air enters through a common return duct on all floors. It passes first through a fine water spray where it is cleansed and humidified, then passes over eliminator and scrubber plates, which remove dirt and entrained moisture. By this process most of the dirt is carried off by the water before the air enters a bank of spun glass filters, and the need for constant removal and cleaning of the filters is eliminated.

Next the air passes through a copper fin radiator, to be heated to approximately 160° F. before being forced into the apartments by a large fan.

The fan runs continuously at low speed, supplying constant air circulation and humidification. It is controlled by a fan switch on the boiler, set at one-half pound steam pressure. The fan runs at high speed only when the steam in the conditioner is over one-half pound, and the thermostat is calling for heat.

The system provides a complete change of air every 12 minutes, recirculating approximately 450,000 cu. ft. of air per hour.

Near the thermostat, located in the front hall of the building, is a humidistat, which controls the flow of water to the spray by means of a magnetic valve. By humidifying the cold air as it returns to the air conditioner, instead of the warm air, a better regulation of relative humidity is obtained.

The water to the spray runs continuously. With both the fan and water sprays in operation at all times, the air to apartments is cleaned and humidified regardless of whether the burner is operating.

When the humidistat is satisfied, the magnetic valve shuts off the sprays, but sufficient wetness remains on the eliminator and scrubber plates to catch dust until the water again flows.

In providing heat for the top floor, it was necessary to run a main supply duct through the air shaft to a blind attic. Registers for each room were installed in the ceiling, and these connected to the main duct. Provision has been made to reverse the air flow through these top floor ducts so that hot summer air may be discharged outside.

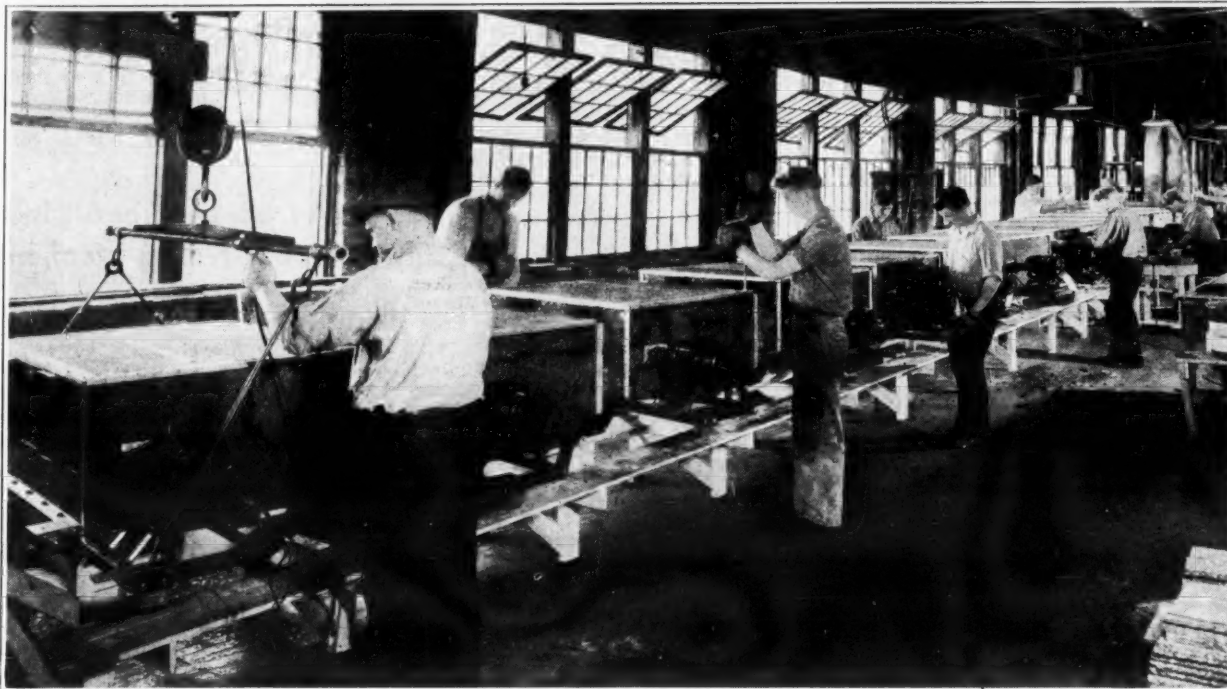
No cooling system has been installed but provision has been made for another set of sprays in addition to the present ones. When cooling is desired, it is proposed to run cold water through the sprays, refrigeration being supplied either with an ice bunker or mechanical equipment.

A summer recirculating and ventilating switch is provided, however, permitting the superintendent to operate the large air conditioner fan during the warm weather months.

### Kansas City Police Have Air-Conditioned Studio

KANSAS CITY — The Kansas City Police Department broadcasts from an air-conditioned studio equipped with a Kelvinator floor-type cabinet unit. Broadcasting is done from a sealed, insulated room with no street noises or dirt from open windows.

The condensing unit for this installation was placed in a corner of the adjoining court room. Installation was made by Richards & Conover Hardware Co., Kelvinator distributor in the Kansas City territory.



On the production line at the Young Radiator Co. plant at Racine, Wis. (above), are air-conditioning units being manufactured for the Chicago, Milwaukee & St. Paul Railway. Two of the units are used in each car on trains operating between Chicago and the West Coast.

### Lubrite Office Has Year 'Round System

ST. LOUIS — New home of the Lubrite division of the Socony-Vacuum Oil Co., recently opened at 4140 Lindell boulevard, in the center of an exclusive residential section, has been equipped with a year-round air-conditioning system employing electric refrigeration for summer cooling.

Guiding motive behind its installation was the desire of Lubrite officials to improve the efficiency of the company's personnel by providing more healthful and comfortable working conditions.

A number of structural features have been incorporated in the building, most interesting of which is the use of single-sash windows which cannot be opened. Every window is permanently closed, and the cracks are caulked.

#### Savings Pay for Equipment

Elimination of extra costs for recessed radiators, fans and wiring for their installation, screens, and hardware, resulted in savings, which, to a large extent, offset the cost of the air-conditioning equipment.

Outside air is introduced into air-conditioning system, where it is filtered, cleaned, and brought to the desired temperature and humidity before being distributed through the building. A blower circulates 20,000 cu. ft. of air per minute through a system of ducts, providing a complete change of air every eight minutes.

In the general office, the air inlets are in the center of the room, directed toward the windows—the air sweeping the outside wall first and then drifting toward the return outlets at a uniform temperature.

In private offices, the air inlets are above the doors, directed toward the outside walls, and are provided with individual hand-controlled dampers so that the occupant can regulate the temperature to suit himself.

#### Concealed Grilles Used

Decorative scheme of the executive offices is not marred by evidence of the air inlets or outlets, conditioned air being introduced through concealed grilles in a lighting fixture in the center of the room.

Winter conditioning is provided by a bank of steam coils in the conditioning unit, which heat the air for the entire building. Flow of steam is controlled by electrically-operated valves, maintaining a constantly even temperature throughout the building.

Water sprays, capable of evaporating four gallons of water per hour, are located in the conditioning unit. Controls automatically regulate the amount of water, so that the desired humidity is maintained at all times.

In summer, two refrigeration compressors supply refrigeration to a bank of cooling and dehumidifying coils. Operation of all parts of the system is unified in a combination of electrically-operated controls. Once these controls are set, the system becomes automatically self-regulating.

In front of the office building is a modern service station, operated by Lubrite, the waiting rooms of which are equipped with individual air-conditioning units for heating and cooling. These have their own control system, and are supplied with refrigeration from a separate compressor, independent of the main part of the building.

The service station is thought to be the first structure of its kind to be air-conditioned in this section of the country.

### Statler Hotel Reports Increases Due to Air Cooling

DETROIT—Increase of 17 per cent in room count and 24½ per cent in dining room traffic during the months of June, July, and August last year has been reported by officials of Hotel Statler here, following the installation of air-conditioning equipment in 29 guest rooms and in its restaurant and public rooms.

Figures for the same period on the company's hotel in Buffalo show a decrease of 14 per cent in room count and an increase of 18.8 per cent in guests served, and for the Hotel Statler in Cleveland, a decrease of 25.4 per cent in room count and 5.1 per cent in guests served.

Preponderance of guest comment was favorable to the cooling system, 151 comments being tabulated as follows: "perfectly pleased," 93; "rooms most comfortable of any ever experienced," 20; "enjoyed good night's rest," 14; "relieved hay fever," 4; "relieved asthma," 1; "stopped at Statler because of air conditioning," 4; "was free from dirt," 2; "liked comfort of dining and ball rooms," 13.

The comparatively few unfavorable comments, made soon after the installation and before the conditions complained of were corrected, included "system not working," "too noisy," "not as much air flow as expected," "caught cold," "too stuffy," and "too much difference between corridor and room temperature."

Cost of operation (coal, current, and water) of the air-conditioning system was \$3,986.95—\$844.50 for the 10 days of June, \$1,547.90 for July, and \$1,594.55 for August. Refrigeration equipment is of the steam jet type.

### Cleveland Organizes Air Conditioning Bureau

CLEVELAND—New feature of the air-conditioning show, planned to open in the Electrical League of Cleveland auditorium on or about March 15, is the inauguration of an air-conditioning bureau, which will make arrangements for speakers and acts as central information bureau for air conditioning.

The show will be similar to the one held last year, with exhibits of various types of air-conditioning equipment on display.

### Newspaper Plans 3 Conditioned Homes

CHICAGO—The Chicago American, evening newspaper here, plans to build three air-conditioned homes which will demonstrate modern construction and equipment. The houses will be financed under Title II of the National Housing Act.

Sites will be chosen in different sections of the city or suburbs. The financing of the homes will be under the long term insured mortgage plan of the FHA, a plan that enables the prospective home owner to borrow up to 80 per cent of the appraised value of the property, the loan to be repaid in monthly instalments over a period of 20 years.

The houses will be of moderate size, five, six, or seven rooms, with a garage. Total cost, including the land, is not to exceed \$10,000 each.

Skilled architects will design the houses and superintend their construction.

Procedure throughout will be similar to that of a private individual undertaking the building of a home. Exact costs will be kept.

### Central System Cools Chicago Bank

CHICAGO—Year-round air-conditioning system was recently installed in the American National Bank & Trust Co. here by the Kroeschell Engineering Co.

Two large central air conditioners, with fans and ducts, located on one of the upper floors, supply conditioned air to the four floors occupied by the bank.

A motor-driven Worthington carbon dioxide compressor located in the sub-basement supplies refrigeration during the summer.

Air supply grilles, located near the ceiling of the general banking floor, diffuse the air horizontally across the room.

### Air Conditioning Increases Profit on Poultry

OKLAHOMA CITY—An Oklahoma poultry raiser claims that after installation of air conditioning in his houses, poultry gained poundage, egg production went up, and deaths dropped below normal.

## BARE COMPRESSORS

FOR ASSEMBLERS AND SERVICE REPLACEMENT



#### PRECISION MADE

—and of the same approved design and construction that have made the "M&E" complete line famous from coast to coast for efficiency and durability. Ninth successful year!

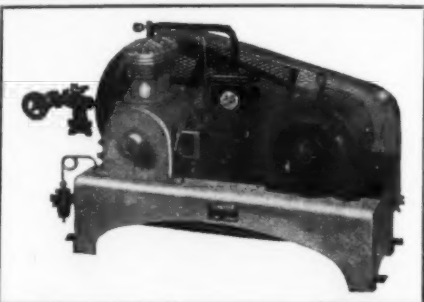
Service companies and Assemblers are invited to write for SPECIAL PLANS.

Catalogs on request

## MERCHANT & EVANS CO.

MANUFACTURERS PHILADELPHIA EST. 1866 - Plant: LANCASTER, PA.

FREON



UNITS

## FOR AIR CONDITIONING

When using Reliance Condensing Units you receive the advantages of using equipment made by a company that has been a pioneer in refrigeration and air conditioning development. Your choice of 19 Freon and Methyl Chloride condensing units, 1/3 to 50 tons daily capacity.

Reliance ALL-STEEL Finned Coils have higher B.T.U. efficiency. Galvanized—hot dipped after assembly, giving real metal-to-metal contacts. No electrolytic deposits. Inquiries invited from contractors, engineers and builders of air conditioning equipment.

RELiance REFRIGERATING MACHINE CO. 3409 NORTH KEDZIE AVE., CHICAGO

Export Div.: A. J. Alsdorf Corp., 223 W. Jackson Blvd., Chicago, Ill., U. S. A. Cable ALSDORF-CHICAGO

## "Note to Refrigerant Buyers"

*I insist upon Ansul Refrigerants for highest quality always*

Ansul can make that statement without reservation. Before a cylinder of Ansul SULPHUR DIOXIDE or Ansul METHYL CHLORIDE leaves our plant it is given an individual analysis to make certain that the quality is such that it will render perfect refrigeration service. It's your assurance of absolute satisfaction.

ANSUL CHEMICAL COMPANY MARINETTE . . . . . WISCONSIN



## 1934 Cooling Installations Show Gain in Philadelphia, Boston; Lag in New York

(Concluded from Page 1, Column 3)  
ature personally addressed to a carefully prepared list of prospects.

The literature was mailed in geographic groups at intervals of one week between the several pieces. One week following the second piece a salesman called on the customer to offer the utility's engineering service on air-conditioning problems.

The good prospects were then turned over to the cooperating group of manufacturers of air-conditioning equipment.

Similar campaigns will be conducted this year, says J. F. Gaskill, manager, industrial sales department, Philadelphia Electric Co. The utility will get help from the Electrical Association of Philadelphia, which is planning to send out a 36-page brochure depicting the progress and acceptance of air conditioning in Philadelphia.

During 1934, a total of 49 Boston business establishments and private residences were air conditioned, more than doubling the number of installations made in 1933.

In the tabulation made by Daniel Ricker of the Edison Electric Illuminating Co., installations in private offices and private residences are lumped together, and constitute the largest single classification, 19 systems in all falling within this grouping.

Outstanding installation, from the standpoint of size, was that made by Carrier in the Wm. Filene department store. This installation has a connected load of 2,000 hp., and covers eight floors in the main building and all sales space in the annex.

Formation of an Air-Conditioning Bureau during the early part of 1934 was the chief development of air conditioning in New England's main city.

Bureau membership included representatives of manufacturers, utilities, service companies, and contractor-dealers. It now boasts a membership of approximately 140 people.

Regular monthly meetings have been held with discussions of current problems, and program features furnished by the members. A cooperative exhibit was held during the months of June and July.

In forwarding the data for New York City, Charles R. Skinner, manager, industrial sales bureau, New York Edison Co., declares that the

figures given in the table do not include all of the larger installations, information on these systems still being checked.

However, it does seem probable that any additions to Mr. Skinner's present total of 73 installations will put the total past the 90 installations made during 1933.

In restaurant installations only was any gain shown in the various applications classifications during 1934, 19 systems being installed last year as compared to 13 in 1933.

Considerable cooperative effort was put forth last year in New York City to promote public acceptance of air conditioning, Mr. Skinner declares. While the number of installations may have been less, there was more diversification in applications, installations having been made in funeral parlors, pawnbrokers' shops, liquor stores, and beauty parlors (most of these must be grouped under miscellaneous in the tabulation.)

New York Edison sent out a number of brochures to interested prospects, and offered free engineering service. A number of air-conditioning meetings were held at the rooms of the Electrical Association in Grand Central Palace. These meetings were "specialized" and held for groups of architects, engineers, physicians, etc.

### George Sebree Heads Omaha Dealership On Conditioners

OMAHA—George M. Sebree, formerly with the Baker Ice Machine Co., is now president of the Western Air Conditioning Corp., which handles air-conditioning equipment made by the Baker company, the Trane Co., La Crosse, Wis., and the U. S. Air Conditioning Corp. of Minneapolis.

A combined heating and cooling system, taking care of two private dining rooms and the United Air Lines offices, was recently installed in the Fontanelle hotel by the Western Air Conditioning Corp. Total space cooled is approximately 30,000 cu. ft. Equipment includes a Baker 15-hp., 4-cylinder, Freon unit, with Trane heating and cooling coils.

### Fan-Type Vent for Homes Introduced By Airex

CLEVELAND — Just introduced by Air Controls, Inc., division of the Cleveland Heater Co. is the Airex, a fan-type unit for summer home cooling which may be used alone or with refrigeration type air-conditioning systems.

Designed for attic, floor, or wall installation, the Airex uses no cooling element, depending for its efficiency on the fact that outside air is usually 15 to 20° F. cooler at night than during the day. This cool air is circulated through the house at the rate of 20 to 30 changes per hour, the Airex drawing up the warm air from the rooms and discharging it outside.

The unit is designed to deliver 5,500 cu. ft. of free air per minute, by means of a 30 in. "bird wing" fan rated at 480 r.p.m., and powered by a ¼-hp., 1,725 r.p.m. Century reactance split phase type motor.

The Airex unit is available in five models, with attic, floor, roof, and ceiling suspension types supplementing the standard package, at list prices of \$110 and \$120.

### Ceiling Beams Used on Air Ducts by Detroit Edison

DETROIT—The revamped air-conditioning system in the assembly room of the Detroit Edison Co. makes use of hollow plaster ceiling beams as distributing ducts.

Air is injected into the room from a number of small grilles in the sides of the beams and is returned from the room through various openings at the front and rear of the room.

Ventilating apparatus is housed in a penthouse on the roof.

### Air Conditioning Aids In Converting Boston Houses into Offices

BOSTON—Two old dwellings at 210-12 Newbury St. here have been converted into a modern office building through remodeling and the installation of a year-round air-conditioning system for the National Business Service, an organization which furnishes information on business conditions to thousands of clients.

When modernization was started, rough blueprints of proposed changes were submitted to employees, and prizes offered for suggestions that would make for efficiency in layout or details. This resulted in several good ideas, which were incorporated in the plans.

In remodeling, the brick fronts and bay windows of the old buildings were torn away, and the fronts straightened and faced with a light stone.

Two retail stores were located on the street floor, with offices on the three floors above, reached by a private entrance, and with a shipping door and parking space in the rear. Upper floors were laid out so that the works flows from one department to another down to the mailing room, in what was formerly a cellar of one of the houses.

Heat is supplied to the building through a connection with underground steam mains at the sidewalk, in two independent systems, one for the stores and the other for the offices above. Direct radiation is provided for the stores.

Three conditioners, located in former clothes closets, serve the office. Conditioned air is carried through ducts, and each floor is supplied with independent, automatic regulation. Ducts may be adjusted within the walls for each office separately, and

### Sante Fe Ahead of '35 Schedule on Program For Train Cooling

CHICAGO—All chair cars on Santa Fe trains Nos. 23 and 24 (Grand Canyon Limited), 9 and 2 (The Navajo), 22 (The Missionary), and 5 and 6 (The Ranger), between Chicago and the southwest, are now air conditioned and in service.

This part of the Santa Fe's 1935 air-conditioning program has been finished ahead of schedule. Air conditioning of all standard and tourist sleepers on these trains, as well as of remaining standard sleepers on The Chief and the California Limited, two other crack trains, is expected to be completed by May 15.

In 1934 the road air conditioned 89 dining, observation, lounge, and club cars, and companion and drawing room sleepers. When the present program is completed, the Santa Fe will have nearly 370 air-conditioned cars.

Principal Santa Fe transcontinental trains, serving every class of travel, will be air conditioned from end to end this summer.

desired temperatures kept in every room.

In mild weather, the heat can be shut off at the main intake and outdoor air can be circulated as desired by the fan system.

In summer, the heat may be shut off and the system switched to the cooling and humidifying system, powered by two 5-hp. and one one 3-hp. compressor. A separate refrigerating system provides cold drinking water at all times. In some rooms, conditioned air inlets are located in the ceilings, with returns on the lower walls or under the doors. On the top floor, inlets and returns are at about the same level.

### New York Air Conditioning Installations

Type of Establishment	Prior to 1933		During 1933		During 1934		Total Thru 1934	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Industrial Estab.	5	313	..	..	3	13	8	326
Banks	5	1,537	3	234	2	39	10	1,810
Clubs	2	12	1	62	..	..	3	74
Hotels	12	2,145	3	65	3	67	18	2,277
Miscellaneous	9	1,304	5	223	8	40	22	1,567
Offices	47	5,175	37	905	24	431	108	6,511
Residences	3	7	12	36	5	8	20	51
Restaurants	40	2,164	13	387	19	476	72	3,027
Stores	8	562	12	1,566	6	55	26	2,183
Studios (Radio)	3	296	1	1,782	1	8	5	2,086
Theaters	40	10,793	2	1,306	..	..	42	12,099
Theaters (Ice)	..	..	1	25	2	67	3	92
<b>Total</b>	<b>174</b>	<b>24,308</b>	<b>90</b>	<b>6,591</b>	<b>73</b>	<b>1,204</b>	<b>335</b>	<b>32,103</b>

### Boston Air Conditioning Installations

Type of Establishment	Prior to 1933		During 1933		During 1934		Total Thru 1934	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Department Stores	3	550	5	27½	6	2,198	14	2,775½
Theaters	12	2,745	1	60	..	..	13	2,805
Hotels, Restaurants	5	95	5	115½	17	413½	..	624
Industrial	9	250	..	..	..	..	9	250
Residences, Offices	8	10	9	259	19	56½	36	325½
Beauty Shops	..	..	1	15	3	39	4	54
Museums	..	..	1	1	..	..	1	1
Night Clubs	..	..	2	23	..	..	2	23
Miscellaneous	..	..	..	15	..	..	..	15
Banks	..	..	..	..	3	20	3	20
Halls	..	..	..	..	1	28	1	28
<b>Total</b>	<b>37</b>	<b>3,650</b>	<b>24</b>	<b>516</b>	<b>49</b>	<b>2,755</b>	<b>83</b>	<b>6,921</b>

### Philadelphia Air Conditioning Installations

Type of Establishment	Prior to 1933		During 1933		During 1934		Total Thru 1934	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Apartments (Commercial Contracts)	..	..	..	..	6	4.0	6	4.0
Auditoriums	3	563	..	..	..	..	3	563.0
Bakeries	7	271	1	28	..	..	8	299.0
Banks	4	260	..	..	2	180.0	6	440.0
Breweries	..	..	2	99	..	..	2	99.0
Buildings—Office	1	2,275	..	..	..	..	1	2,275.0
Candy Mfgs.	4	801	5	180	3	290.0	12	1,271.0
Chemists	3	43	1	40	1	7.0	5	90.0
Cigar Mfgs.	8	938	..	..	1	12.0	9	950.0
Country Clubs	1	3	..	..	..	..	1	3.0
Funeral Parlors	1	3	3	27	2	15.2	6	45.2
Hospitals	2	103	..	..	2	17.0	4	120.0
Leather Mfgs.	1	75	1	163	..	..	2	238.0
Meat Packers	2	82	3	44	..	..	5	126.0
Misc. Commercial	..	..	..	..	5	320.8	5	320.8
Misc. Industrial	1	15	..	..	4	58.0	5	73.0
Museum	1	100	..	..	..	..	1	100.0
Offices	..	..	..	..	..	..	..	..
Board Rooms, etc.	14	71	9	90	24	121.5	47	282.5
Printers—Paper, etc.	3	77	..	..	3	10.0	6	87.0
Residences	..	..	..	..	37	56.0	37	56.0
Restaurants	11	677	4	114	16	226.4	31	1,017.4
Schools	..	..	5	75	21	391.0	26	466.0
Stores—Retail	8	510	9	114	14	243.6	31	867.6
Stores—Department	2	1,768	..	..	1	274.0	3	2,042.0
Storage—Food	..	..	..	..	1	30.0	1	30.0
Studios	1	73	..	..	1	34.3	2	107.3
Textile	11	607	3	69	1	22.0	15	698.0
Theaters	25	4,431	..	..	4	143.0	29	4,574.0
<b>Totals</b>	<b>114</b>	<b>13,746</b>	<b>46</b>	<b>1,043</b>	<b>149</b>	<b>2,455.8</b>	<b>309</b>	<b>17,244.0</b>

# COMFORT COOLING



The Minneapolis-Honeywell Refrigeration Pressure Control, L 413. Visible scales and locking and leveling devices at no extra cost. Mercury switch action. Simple and dependable. Available in all desired temperature and pressure ranges.

As it  
should be

COMFORT Cooling—in fact all phases of Air Conditioning—to function best, demands proper control. The control system must be flexible enough and complete enough to be applicable to any type of air conditioning system and to any type of installation... The Minneapolis-Honeywell Modutrol System is capable of handling any job. It will insure completely balanced and harmonious operation of comfort cooling or air conditioning equipment and will centralize responsibility as well. Our engineers are always at your disposal... Minneapolis-Honeywell Regulator Company, 2807 Fourth Avenue So., Minneapolis, Minnesota... Branch and distributing offices in all principal cities.

## MINNEAPOLIS-HONEYWELL

Control Systems



## Circulation of Outdoor Night Air Used to Supplement Day Cooling in Residence

(Continued from page 14, Column 5)  
from outdoors and delivered it into the rooms through the duct system. The fan delivery was 2,251 c.f.m., or 9.5 air changes per hour.

### Series 6-34. Circulation of Outdoor Air at Night Without Artificial Cooling During the Day

Same as Series 5-34 except that the windows were closed and the fan stopped at 7 a. m. instead of 6 a. m.

### Cooling with Outdoor Air at Night

During the summer of 1933, studies were made with various combinations of window openings and fans for cooling with outdoor air at night. With one exception these studies were made with both first and second story windows open. The one exception was made with a fan in the attic drawing in 3,980 c.f.m., which was approximately 33.6 air changes per hour based on the second story alone, or 16.8 based on the house as a whole.

Since it is undesirable in the average city residence to have the first story windows open all night, it seemed more practical in the case of the 1934 studies to confine the open windows to the second story alone. Furthermore, it also seemed more practical from the standpoint of the householder to employ the fan in the forced-air heating system circulating 2,251 c.f.m., or approximately 9.5 air changes per hour, rather than to install additional fans in order to circulate a greater volume of air.

In the previous paper it was shown that the minimum indoor temperature attained at night was practically the same as that existing when the windows were closed at 6 a. m.

### Result of Fan on Second Floor Only

It was observed that in the case of the attic fan drawing approximately 33.6 air changes through the second story windows alone, the effectiveness in cooling the house as a whole, based on the average indoor temperature for both stories, was much less than that in cooling the second story alone based on the average indoor temperature for the second story.

When cooling with outdoor air at night is used to supplement artificial cooling during the day, however, the effectiveness of night cooling in the house as a whole is of more significance than the effectiveness for the second story alone.

The effectiveness of cooling the house as a whole was but slightly greater for the fan in the forced-air heating system when it was circulating approximately 9.5 air changes per hour, and with both first and second story windows open, than it was for the attic fan drawing in 33.6 air changes per hour through the second story windows alone.

The effectiveness of cooling for the house as a whole with the fan in the forced-air heating system circulating 9.5 air changes per hour and the second story windows alone open was somewhat less than that for either of the latter methods.

Test data indicates that the effectiveness of night cooling was not greatly influenced by whether the

windows were closed at 6 a. m., as for Series 5-34, or at 7 a. m., as for Series 6-34; or whether they were opened at 6 p. m. or at the time that the effective temperature became the same indoors and outdoors, as for Series 3-34.

The relative effectiveness of the different methods may be considered as dependent on the amount of air circulated and not inherent in the particular method used for circulating the air. Under these conditions, sufficient data are available from the studies of 1933 and 1934 to establish the range of the number of air changes that would be required to prove effective for night cooling in a house of the type of the Research Residence.

From a study of the data available (Editor's note: a description of the manner in which this data was plotted

On this day the outdoor temperature was 97.1° F. at 2 p. m. and reached a maximum of 99° F. at 3:45 p. m. At that time the house was being operated on Series 4-34 and the windows had remained closed during the night preceding the test.

The fan in the forced-air system had continued to operate during the off period of the compressor, shown from 1:30 a. m. to 6:30 a. m. in Fig. 3, and ventilating air from the outdoors was drawn in resulting in a rise in the relative humidity indoors.

At 6:30 a. m. the compressor was started through the action of the thermostat and operated intermittently until 11:20 a. m. The compressor operated continuously at full load capacity from 11:20 to 11:15 p. m., at which time intermittent operation was resumed.

During the long off period from 1:30 a. m. to 6:30 a. m., the cooling coil evidently warmed up and the temperature became practically the same as the air temperature. The intermittent periods of operation were

Figure 3—Cooling Load

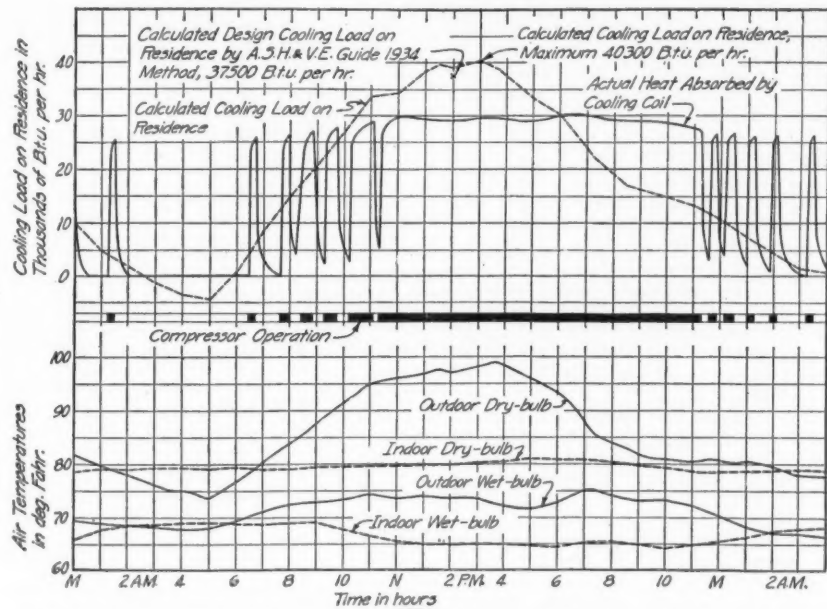


Fig. 6—Actual and calculated cooling load on residence and air temperatures, Test No. 7-34, June 27, 1934. No night air cooling employed.

is omitted) it is therefore evident that cooling with outdoor air at night does not become reasonably effective until the number of air changes per hour reaches a value of approximately 9, and that above a value of 30 air changes per hour the gain resulting from increasing the amount of air circulated is very small. At some point the gain obtained by increasing the number of air changes per hour will probably be offset by the increased cost of electrical current required to operate the fan.

### Cooling with Mechanical Refrigeration

The operating characteristics of the cooling plant and a comparison of the actual and calculated cooling loads for the house can best be illustrated by the results obtained on a typical day. For this purpose a test made on June 27, 1934, was selected and the results are shown in Fig. 3 and Table 1.

not sufficiently long to establish equilibrium, and full capacity of the machine was not absorbed from the air until the compressor started to operate continuously.

### Actual & Calculated Loads Compared

During the hours from midnight to 5 a. m. the indoor temperature remained constant owing to the heat capacity of the structure while the calculated load curve showed decreasing cooling load. From 6 a. m. until 10 a. m. the actual average load approximated the calculated load. After 10 a. m., however, the actual load was less than the calculated load until approximately 6:10 p. m., at which time the two became equal. The calculated load attained a maximum of 40,300 B.t.u. per hour while the actual load never rose above 30,500 B.t.u. per hour.

The effect of the heat lag of the structure is most strikingly shown in the period from 6:10 p. m. to 11:15 p. m. At the latter time the calculated load had decreased to 12,500 B.t.u. per hour while 27,500 B.t.u. per hour were still being absorbed from the air. During the day the temperature of the air indoors rose from 79° F. to 81° F. From 6:10 p. m. to 11:15 p. m. the indoor temperature was reduced from 81° F. to 79° F.

This was taken into account in the calculated load curve, but is not sufficient to explain the wide discrepancy between the actual and calculated loads. From 11:15 p. m. to 3 a. m. the calculated load continued to decrease somewhat more rapidly than the actual load.

The calculated cooling load was based on the first and second stories only. It included the heat transmission through the walls, floors, ceilings, and glass, sun effect on walls and glass, sensible heat brought in by the air used for ventilation, heat brought in by moisture in the air used for ventilation, heat from 4 occupants, heat from lights, and heat supplied by the electrical input to the fan, and was based on the hourly observed indoor and outdoor wet and dry-bulb temperatures.

The heat equivalent to the electrical input to the compressor motor was not included as it was regarded as all being dissipated in the basement.

An attempt was made to determine the pressure built up in the first and second stories by the operation of the result in a quantitative determination ventilating fan. While this did not result in a quantitative determination of the actual pressure, it did indicate that the pressure was slightly greater than atmospheric.

Hence it was considered that infiltration through windows could be neglected, and all infiltration could be credited to the air brought in for ventilation, amounting to approximately one air change per hour.

The sun effect based on unshaded (Continued on Page 16, Column 1)

## INDESTRUCTIBLE CAST-ALUMINUM ROTOR

assures quietness, permanence and "care-free" performance



Cutaway view, showing indestructible cast-rotor bars. Ventilating fan, when used, is cast integral with squirrel-cage winding

A FEATURE of the 1935 G-E CAPACITOR-MOTOR is its one-piece aluminum rotor—no soldered or welded joints

IT IS another assurance of lasting, "trouble-free" service. Its squirrel-cage winding is a solid-aluminum casting formed by a unique high-pressure method developed by G-E engineers.

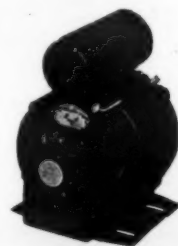
This cast rotor assures you the advantages of good balance, permanent magnetic characteristics, quiet operation, and "trouble-proof" construction.

NO OTHER MOTOR HAS SO MANY FEATURES THAT WILL HELP YOU SELL REFRIGERATORS

END-PLAY SILENCERS  
BELT TIGHTENER  
LARGE OIL CAPACITY

CAST-ALUMINUM ROTOR  
BUILT-IN TERMINAL BOX  
QUIET, RELIABLE SWITCH

Bulletin GEA-977C contains complete information. Address the nearest G-E office, or General Electric, Dept. 6A-201, Schenectady, N. Y.



Type KC capacitor-motor with standard base



Type KC capacitor-motor with automatic belt-tightener base

070-67

GENERAL ELECTRIC

Table 1—Operating Data for One Day

Table 1—Typical operating data and results with mechanical refrigeration at 2 p. m. on June 27, 1934.

1. Outdoor air	D.B. 97.1° F, W.B. 73.6° F, R.H. 33%
2. Indoor air, avg. breath. level temp.	86.8
3. Indoor air, house avg. at breath. level	D.B. 79.9° F, W.B. 65.2° F, R.H. 45.5%
4. Moisture content, gr. per lb. dry air	70.0
5. Ventilating air	D.B. 94.3° F, W.B. 76.5° F, R.H. 44.5%
6. Moisture content, gr. per lb. dry air	108.6
7. Mixed air entering cooling coil	D.B. 81.5° F, W.B. 67.2° F, R.H. 47.5%
8. Moisture content, gr. per lb. dry air	76.9
9. Mixed air leaving cooling coil	D.B. 65.6° F, W.B. 59.9° F, R.H. 72.0%
10. Moisture content, gr. per lb. dry air	68.1
11. Air temp. drop through cooling coil	15.9
12. Temp. of cooled air leaving registers, 1st and 2nd story avg., F.	70.0
13. Air temp. rise in ducts and casing, F.	4.4
14. Basement air temp. at breath. level, F.	77.3
15. Quantity of air circulated	1,303 cfm or 5,660 lb. of dry air per hour
16. Density of air lb. per cu. ft.	0.0724
17. No. of house air recirculations per hour	3.5
18. Cooling coil	face area 3.54 sq. ft., free area 2.13 sq. ft.
19. Air face velocity, f.p.m.	368
20. Air velocity through free area, f.p.m.	598
21. Ventilating air	240 cfm or 1,015 lb. dry air per hour
22. Density of air lb. per cu. ft.	0.0707
23. Moisture condensed from air, lb. per hour	7.11
24. Heat absorbed by cooling coil; total	29,065 B.t.u. per hour
25. Heat due to moisture in air	7,466 B.t.u. per hour; 25.7% of total heat absorbed
26. Sensible heat	21,599 B.t.u. per hour; 74.3% of total heat absorbed
27. Water temp. through condenser, F.	Inlet 59.7, Outlet 98.0, Rise 38.3
28. Water temp. through condenser, compressor, and basement, F.	Entering 59.7, Drain 100.0, Rise 40.3
29. Quantity of condenser water, per hour	800.5 lb. or 96.1 gal.
30. Heat absorbed by water passing through condenser	30,659 B.t.u. per hour
31. Heat absorbed by water passing through condenser, compressor, and basement	32,262 B.t.u. per hour
32. Heat equivalent of power input to compressor motor	9,980 B.t.u. per hour
33. Net cooling load or heat gain on entire house (Item 21—Item 22)	22,282 B.t.u. per hour
34. Ratio of net heat gain to total heat absorbed in cooling coil (Item 23/Item 16)	0.767
35. Temp. of cooling coil, F.	Inlet 42.4, Control bulb 57.1, Outlet 74.0
36. Refrigerant pressures, lb. per sq. in.	Suction 40, Discharge 130
37. Nominal rating of condensing unit with 32° F. refrigerant, 60° F. condensing water, and 90° F. ambient air	29,500 B.t.u. per hour
38. Compressor motor data	Size 3 hp., Measured power rate 2.92 kw.
39. Compressor speed	235 r.p.m.
40. Recirculating fan data	Speed 568 r.p.m.
41. Motor	Size 1/3 hp., Measured power rate 0.340 kw.

\*Test No. 7-34.

## AIR CONDITIONING

### Tests Show Operating Characteristics of Cooling System in Research Residence

(Continued from Page 15, Column 3)

windows was calculated by using the sun intensity curves for east, south, and west vertical surfaces for the month of July from the work of F. C. Houghton and others, and by multiplying the value thus obtained by 0.83 to obtain the heat transmitted through the glass. Since all of the windows in the walls exposed to the sun were equipped with awnings, the heat transmitted through the shaded windows was obtained by taking 28 per cent of the heat calculated for unshaded windows, as indicated by more recent studies of F. C. Houghton and others.

The heat transmitted through the walls due to the action of the sun on the exposed portions was calculated by the following method. Of the total intensity of the sun a part,  $I$ , depending on the angle of incidence, is received by the surface. A portion,  $eI$ , depending on the absorption coefficient,  $e$ , is absorbed by the surface. This tends to raise the temperature of the surface and of  $eI$ , a portion,  $H_1$ , is lost by radiation and convection to the outdoor air, and another portion,  $H_2$ , is transmitted through the wall to the indoor air. From these considerations the following equations may be established:

$$eI = H_1 + H_2 \text{ or } H_2 = eI - H_1$$

$$H_2 = (t_x - t_y)C = (t_y - t_i)f_i$$

$$H_1 = (t_x - t_o)f_o$$

In which  $t_o$ =temperature of outdoor air, degrees F.

$t_i$ =temperature of indoor air, degrees F.

$t_x$ =temperature of outside surface of wall, degrees F.

$t_y$ =temperature of inside surface of wall, degrees F.

$I$ =sun intensity for a given angle of incidence, B.t.u. per sq. ft. per hr.

$e$ =emissivity, or absorption coefficient.

$H_1$ =portion of  $eI$  lost to outdoor air, B.t.u. per sq. ft. per hr.

$H_2$ =portion of  $eI$  transmitted through wall, B.t.u. per sq. ft. per hr.

$f_o$ =outside surface coefficient, B.t.u. per sq. ft. per hr. per degree difference in temperature between  $t_x$  and  $t_o$ .

$f_i$ =inside surface coefficient, B.t.u. per sq. ft. per hr. per degree difference in temperature between  $t_y$  and  $t_i$ .

$C$ =conductance of wall, B.t.u. per sq. ft. per hr. per degree difference in temperature between  $t_x$  and  $t_y$ .

For given indoor and outdoor temperatures and a given sun intensity the portion,  $H_2$ , of the heat transmitted through the wall may be obtained by the simultaneous solution of these equations. For the purpose of calculating the load for the Research Residence a value of 0.40 was assumed for the absorption coefficient,  $e$ , and it was assumed that when the sun was shining on a wall 50 per cent of the net area was actually exposed to the sun and 50 per cent was shaded by shadows from the awnings, shutters, etc. The latter assumption was based on studies of the

amount of shading at different times of the day.

For the purpose of comparison the design load calculated by the method outlined in *The A.S.H.V.E. Guide 1934* has been shown as a single point in Fig. 3. Certain modifications and assumptions were necessary in applying this method. The heat from the sun transmitted through the windows was obtained by using a value taken at 2 p. m. from the intensity curves given in *The Guide*, and by multiplying this result by 0.83 to allow for heat intercepted by the glass and by 0.28 to allow for the shading effect of the awnings.

In order to obtain the sun effect on the walls a value of 25° F. was added to the difference in temperature between outdoor and indoor air as recommended. The south and west walls only were regarded as exposed to the sun, and 50 per cent of the net area of these walls was regarded as shaded by awnings and shutters.

Design temperature of 91° F. was selected from the table in *The Guide* and the average of 80° F. was used for the indoor temperature. The temperature in the attic was assumed as 15° F. higher than the outdoor temperature. It may be observed that this calculated design load was 37,500 B.t.u. per hour as compared with the actual load of approximately 30,000 B.t.u. per hour. The latter proved sufficient to cool the house satisfactorily.

#### Relative Humidity 45%

The indoor relative humidity was approximately 61 per cent until 9 a. m., as indicated in Fig. 3. During the early period of intermittent operation of the compressor, the relative humidity decreased until the compressor operated continuously, at which time it assumed a value of approximately 45 per cent and remained practically constant at this value until the compressor again began to operate intermittently.

Characteristic results obtained during the continuous operating periods of the compressor are shown in Table 1. The air conditions at different locations are given in the first ten items of the table. The dry-bulb temperature on the second story was only 1° F. higher than that on the first, thus representing a very satisfactory balance of the cooling on the two stories.

The ventilating air was taken from a large sunken window areaway on the north side of the residence. This areaway was at the junction of the main body of the house and the north wing forming the kitchen, and hence was protected from the sun on both the south and the west. The temperature of the ventilating air was therefore somewhat lower and the relative humidity somewhat higher than the corresponding values of the outdoor air.

The temperature of the cooled air leaving the registers was never lower than 68° F. and no difficulty was experienced from drafts in the rooms.

The rise in temperature of the air passing through the furnace casing and ducts was 4.4° F.

The quantity of air circulated was 1,303 c.f.m. which amounted to 5.5 recirculations per hour or 540 c.f.m. per ton of refrigeration absorbed from the air.

With this amount of air the velocity through the face area of the coil was 368 f.p.m. and the temperature drop was 15.9° F. This corresponded closely with the 350 f.p.m. and the 15° F. drop used for the design. The free area velocity of 598 f.p.m. did not prove to be sufficient to carry any condensed moisture away from the surfaces of the cooling coil.

#### Useful Refrigerating Effect

The useful refrigerating effect, or heat absorbed by the cooling coil was 29,065 B.t.u. per hour, which compared favorably with the nominal rating of 29,500 B.t.u. per hour, although the temperature of the refrigerant as shown by Item 25 was considerably above the 32° F. on which the rating was based. Item 25 indicates that considerable superheating occurred in a large portion of the evaporator or cooling coil.

The ratio of the useful refrigerating effect to the heat absorbed by the water passing through the condenser was 0.95. This high ratio may be explained by the fact that considerable heat was lost from the condenser coil to the air in the basement, which would otherwise have been absorbed by the water and thus would have reduced the value of the ratio.

However, this ratio, obtained for long operating periods of the compressor on each test, proved valuable in checking the calculated refrigerating effect for the periods of intermittent operation, during which the validity of using average temperatures for the air and average weights for the water condensed on the coil is somewhat uncertain.

Such calculations based on averages for widely fluctuating conditions resulting from intermittent operation are always subject to some uncertainty.

#### How Heat Absorption was Computed

As shown in Item 16 the useful refrigerating effect or heat absorbed by the cooling coil, was obtained by computing the heat absorbed by the air, which was separated into the sensible heat given up by the dry air and the heat given up by the change in the moisture content of the air in passing through the cooling coil.

In connection with the latter heat quantity, some difficulty was experienced in obtaining accurate readings of the wet-bulb temperatures as observed by means of recording thermocouples. The wicks used on these recording thermocouples became fouled in a short time, thus affecting the accuracy of the observed wet-bulb temperature.

However, a sufficient number of accurate readings were obtained to prove that no great amount of variation occurred in the weight of air and in the entering and leaving wet and dry-bulb temperatures for the air passing through the cooling coil during periods of compressor operation. The weighed amounts of water condensed on the coil were therefore accepted as being accurate, and the heat absorbed was obtained by multiplying this weight by a constant value representing the heat given by the change in moisture content of the air per pound of water vapor condensed.

This latter included the latent heat and superheat in the water vapor condensed, and the change in the superheat in the water vapor remaining in the air after passing the cooling coil, and amounted to 1,050 B.t.u. per pound of vapor condensed.

The weight of water vapor condensed varied from 12.5 to 3.4 pounds per hour based on the periods of continuous operation for the compressor, or from 7.2 to 1.2 based on the total length of the test period over which artificial cooling was required.

Item 21, the heat absorbed by the water passing through the condenser, the compressor heads, and the piping in the basement,  $H_w$ , represents all of the heat that was removed from the house with the exception of that which might have been lost through the basement walls.

#### Motor Heat Considered

In order to separate the heat gains introduced by the presence of the refrigerating machine in the basement, such as electrical and mechanical losses in the compressor motor, mechanical losses in the compressor and drive, and heat losses from the condenser and compressor heads, from the net heat gains which were independent of the presence of the machine, the following heat balance on the house as a whole may be made:

$$H_w = H + H_e, \text{ or } H = H_w - H_e$$

In which  $H_w$ =Total heat removed by the cooling water from the point of entrance to the point of drainage.

$H$ =Net heat gain of house, including heat transmission through walls, ceilings, and glass, infiltration, ventilating air, heat from lights and fan motor, and heat from occupants, but excluding heat lost through the basement walls.

$H_e$ =Heat equivalent of electrical input to the compressor motor.

Figure 4—Hours of Unit Operation

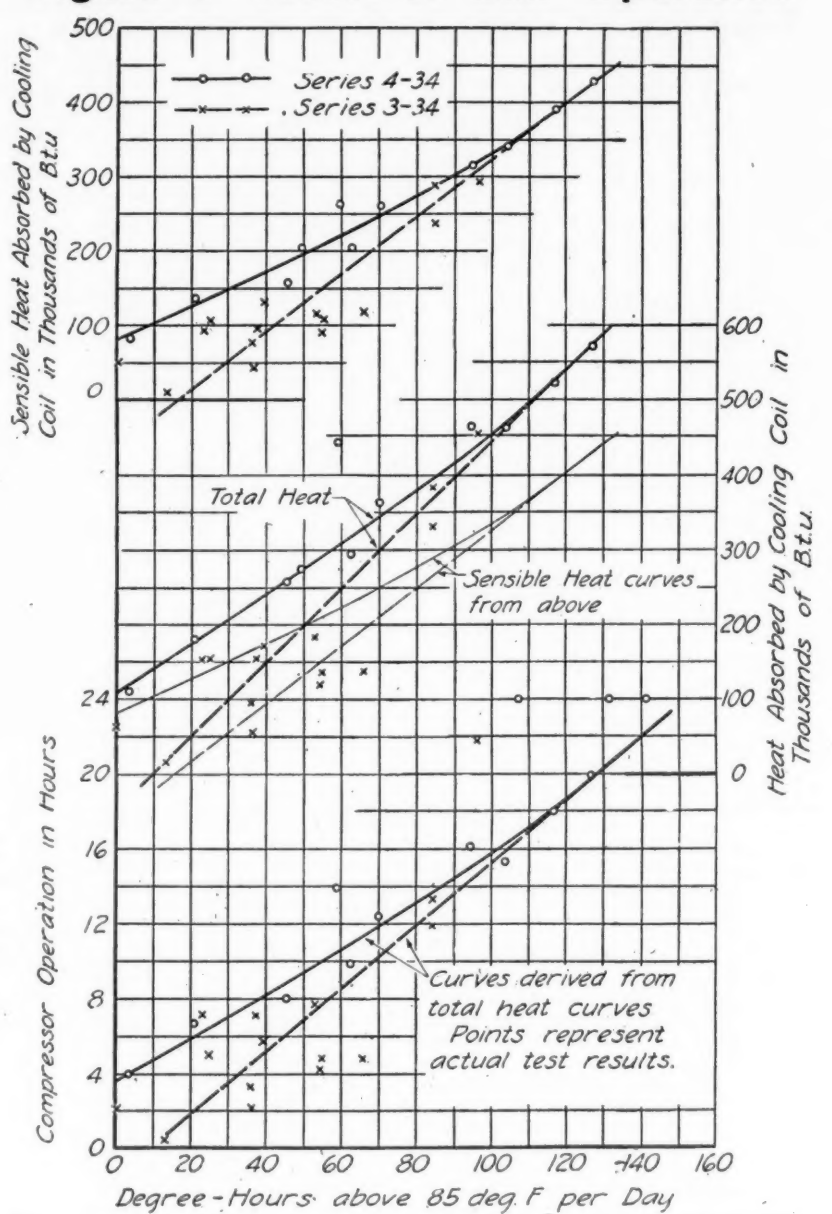


Fig. 4—Heat absorbed by cooling coils and hours of compressor operation per day.

The net heat gain,  $H$ , is shown as Item 23 in Table 1. Item 16, the heat absorbed by the cooling coil, represents the useful refrigerating effect, and since ultimately all of the cooling in the house had to be accomplished by means of the air passing through the coil, it also represents the total amount of refrigeration that had to be expended to cool the house under the conditions of operation with the machine in the basement. If this heat is represented

by  $H_r$ , then the ratio  $\frac{H}{H_r}$  becomes an

index of the additional cooling load imposed by the presence of the refrigerating machine in the basement, since this ratio would be 1.0 if it were possible to operate with no heat loss from the machine or the condenser.

#### Insulation of Condenser Suggested

In some respects this ratio is analogous to the overall house efficiency which may be obtained for winter heating. The value of 0.767, given as Item 24, is relatively low as compared with overall house efficiencies obtained for winter heating. Since  $H = H_w - H_e$  is the net heat gain for the house, it may be observed that for given outdoor weather conditions any increase in the heat loss from the machine or condenser must be compensated for by readjustments in  $H_w$  and  $H_e$ . These readjustments must be such that the difference,  $H$ , remains constant. Any such increase in losses, however, will be directly reflected in an increase in  $H_r$ . Hence the ratio

$\frac{H}{H_r}$  will decrease rapidly as the losses from the machine or condenser are increased. Insofar as operating costs are concerned, it would therefore seem to be advantageous to insulate the condenser or to install the machine outside of the house.

#### Effect of Loss of Charge

Beginning with test No. 17-34, a decrease in the ratio  $\frac{H}{H_r}$  occurred up

to, and including test No. 24-34. This was caused by gradual loss of the charge of refrigerant occurring over this period. As a result, the compressor did not operate efficiently, and the heat losses from the machine and condenser became a larger portion of the useful refrigerating effect. The refrigerant had no odor, and the gradual loss of the charge was obscured by other factors. A small decrease in the drop in temperature was observed, but it was erroneously attributed to an increase in outdoor relative humidity which occurred at about this time.

Furthermore, the electrical input to the compressor motor which was observed by means of an integrating wattmeter did not decrease sufficiently to attract attention. The indoor temperature, however, was maintained lower than 81° F. until test No. 22-34. Hence, only the three tests, Nos. 22-34 to 24-34, inclusive, have been regarded as of doubtful value, and these are useful in determining the effect on comfort of maintaining an indoor temperature higher than 81° F., which is discussed later.

The machine was recharged after test No. 24-34 and on test No. 26-34, during which the maximum outdoor temperature rose to 101.4° F., the ratio  $\frac{H}{H_r}$  rose to a normal value and the indoor temperature was maintained at 80.3° F., indicating that with normal charge of refrigerant no difficulty would have been encountered in maintaining an indoor temperature of 80° F. on the three preceding days for which the maximum outdoor temperature was 100.0° F.

This experience, however, in which

(Concluded on Page 17, Column 1)

## SKILL

To the task of making automatic refrigeration devices is brought the combined experience, research, craftsmanship and industrial equipment of masters of the industry.

Year by year the deposit of skill grows with volume of the business and the present day refrigeration methods are as far ahead of pioneer days as the 16 cylinder automobile transcends the old "one-lunger."

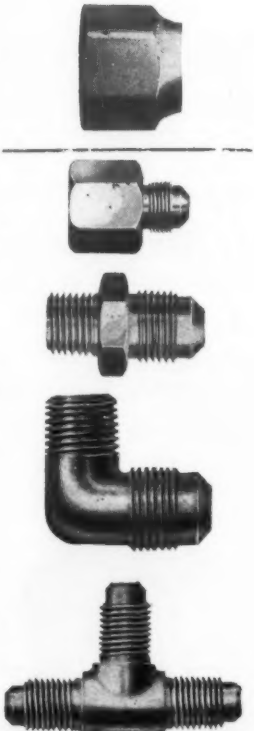
In fittings, the product of Commonwealth Brass Corporation, the advance in the arts include better design, metallurgy, machining, packing and inspection. Fittings of 20 years ago cannot be compared with those of today.

Step by step with development, Commonwealth Fittings have been improved until they now represent the ultimate in seepage-proof fittings.

Manufacturers, installers, and users alike may always rely on Commonwealth Fittings because they are "Built Right To Stay Tight."

### COMMONWEALTH BRASS CORPORATION

Commonwealth Ave. at G. T. R. R.  
DETROIT, MICHIGAN



## ACE HARD RUBBER DOORS

are standard equipment on many famous makes of Refrigerated Display Cases

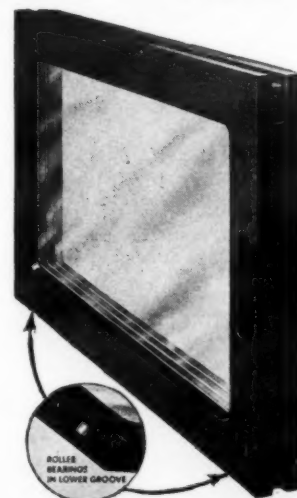
Accuracy in dimensions and interchangeable parts effectually reduce assembly time and labor costs where Ace Equipment is adopted.

The Ace line includes Sliding, Service and Storage Doors, Rails, Jambs, Glazing Strips, Angle Trim, etc.

Write for catalogue and price list

AMERICAN HARD RUBBER CO.

11 Mercer Street, New York, N. Y.  
Akron, Ohio—Chicago, Illinois



## Research Residence Tests Indicate Model Comfort Conditions

(Concluded from Page 16, Column 5)  
the loss of the charge was obscured by other factors even with the machine under constant observation, indicates that from the standpoint of the householder, it would be advantageous to introduce some odor, or other positive means of indicating a leak before the loss of the whole charge has occurred.

The total cooling load for the day, expressed as the total B.t.u. absorbed from the air during the overall period of compressor operation, is shown in Fig. 4 plotted against the degree hours above 85° F. per day. The base temperature of 85° F. was selected because it was found that usually no cooling was required unless the outdoor temperature was approximately 85° F. or above.

Curves for both total heat and sensible heat are shown, and the difference between these curves represents the heat due to the change in the moisture content of the air. This moisture load varied from approximately 25 per cent to 30 per cent of the total load. One point, at 60 degree hours, deviates widely from the total heat curve but does not deviate very widely from the sensible heat curve.

On this particular test, No. 29-34, the outdoor relative humidity was 83.5 per cent, the highest recorded during the summer, and the load due to moisture was excessive.

### Night Air Circulation Tested

A comparison between the results from Series 4-34, for which no cooling with outdoor air at night was employed, and those from Series 3-34, for which supplementary night cooling was used, may be obtained from Fig. 4.

The data for tests Nos. 22-34 to 24-34 inclusive have been omitted from these curves because the average indoor temperature was higher than 81° F. and these tests were not regarded as being comparable with the others.

The results from the two series of tests form two fairly well defined curves. More deviations occurred in the points representing the data from Series 3-34 because the amount of artificial cooling required during the day was directly influenced by the outdoor conditions on the preceding night. The curve represents median conditions, and if the night was exceptionally cool less artificial cooling was required the next day, while if the night was exceptionally warm the reverse was true.

In the case of Series 4-34, for which the windows were not opened at night, the variations in the outdoor conditions at night were not so directly reflected in the amount of cooling required and hence less deviations occurred between the median curve and the points representing individual tests.

From the curves in Fig. 4 it is apparent that considerable saving in the amount of mechanical refrigeration

## Table 2—Summary of 1934 Tests

Table 2—Summary of results of tests with mechanical refrigeration and night air cooling for entire season of 1934.

1. Total hours above 85° F. for season of 1934.....	481.5
2. Total hours above 90° F. for season of 1934.....	224.1
3. Total degree-hours above 85° F. for season of 1934.....	2,675.5
4. Total degree-hours above 90° F. for season of 1934.....	948.75
5. Number of tests with mechanical refrigeration.....	33
6. Total running time for fan during night cooling, hours.....	692.3
7. Average rate of power input to fan during night cooling, watts.....	410
8. Total power input to fan during night cooling, kwh.....	283.8
9. Total running time for fan during test period, hours.....	559.2
10. Average rate of power input to fan during test period, watts.....	314
11. Total power input to fan during test period, kwh.....	175.5
12. Total running time for fan including night cooling, hours.....	1,251.5
13. Total power input to fan including night cooling, kwh.....	458.3
14. Total running time for compressor, hours.....	335.7
15. Average rate of power input to compressor, watts.....	2,836
16. Total power input to compressor, kwh.....	952.1
17. Total power input to compressor and fan, including night cooling, kwh.....	1,411.4
18. Total quantity of cooling water, gallons.....	25,741
19. Total heat absorbed by cooling coil during season, B.t.u.....	8,354,881
20. Equivalent ice meltage during season, tons.....	29.0
21. Corrected ice meltage during season assuming water to the drain of 40° F., tons.....	27.5

required for cooling may be effected by supplementary cooling with outdoor air at night, even when the latter is confined to that which may be obtained by opening only the second story windows at night and employing 9.5 air changes per hour as furnished by the fan in the forced-air heating system. This is particularly true for milder weather.

For Series 3-34, the windows were opened when the outdoor effective temperature became the same as that indoors. As the nights became warmer, this opening time occurred later, and when the degree hours per day reached a value of approximately 110 no windows were opened and Series 3-34 merged into Series 4-34.

On days for which the maximum outdoor temperature reached 80 to 85° F. the windows were opened at about 7 p. m. and no cooling was required the next day. When the maximum outdoor temperature was from 85 to 95° F. the windows were opened sometime between 8 and 10 p. m. and artificial cooling was required the next day. When the maximum outdoor temperature was above 95° F. and the indoor and outdoor effective temperatures did not equalize until later than midnight, the windows were not opened and artificial cooling was employed during the whole of the 24 hours.

### Study of Running Time

The curves in the lower portion of Fig. 4 were computed from the total heat curves in the upper portion, and represent the total time that the compressor would be required to run delivering a constant mean refrigerating load of 29,000 B.t.u. per hour. The actual running times obtained from the observed data for the individual tests have been plotted as points on the curves.

A study of these points shows that with the exception of four points near the upper end of the curves, they fell in about the same positions relative to the curves as the points fell relative to the total and sensible heat curves in the upper portion of Fig. 4. Of the exceptions, the three upper points represent data from tests Nos. 22-34 to 24-34 inclusive, which were excluded from the heat curves because an indoor temperature below 81° F. was not maintained.

The fourth point represents test No. 21-34, which was included in the upper curves because the indoor temperature was maintained at 80.7° F.

### Humid Day Increased Load

The point at 60 degree hours, representing test No. 29-34, is of interest as indicating the increase in running time that was made necessary by the moisture load imposed by an outdoor relative humidity of 83.5 per cent. It may also be observed that extrapolation of the curves to the 24 hour ordinate indicates that the compressor would not be required to operate continuously over the 24 hour period until the number of degree hours per day above 85° F. equalled, or exceeded, approximately 150.

Since this condition does not occur at Urbana, Ill., the data indicate that a refrigerating machine of 2½ tons capacity is ample to maintain an indoor temperature not in excess of 81° F. in a house similar to the Research Residence located where the climate is similar to that at Urbana, Ill.

On all of the tests in which the average indoor temperature for the test was not above 81° F. the maximum indoor temperature did not rise above 81.5° F., and then only for a short time. With outdoor relative humidities between 45 and 55 per cent this was equivalent to effective temperatures between 74 and 75° F. During the daytime these conditions were found to be comfortable both by members of the staff who occupied the Residence more or less constantly and by visitors who were present for short periods only.

### Period of Discomfort

The maximum discomfort occurred with the Series 3-34 tests during the hour just preceding the start of the compressor. After the windows were closed in the morning, the indoor dry-bulb temperature did not rise sufficiently to start the compressor until the late morning or early afternoon hours. During this time that the house was closed and the plant was not operating the indoor relative humidity increased and for a short time the

house felt stuffy. Odors were also somewhat noticeable at this time. When the plant was started, both the slight discomfort and the odors disappeared.

During the Series 4-34 tests, for which the windows were not opened, the plant operated either continuously or at short intermittent periods over the whole 24 hours, and no discomfort or odors were noticeable. The admission of outdoor air for ventilation amounting to approximately one air change per hour was effective in overcoming any odors.

### 80° F. Too High at Night

At night, a temperature of 80° F. was not entirely comfortable for a person lying down. The bed prevented the circulation of air over part of the body and the remaining surface was apparently not sufficient for effective cooling. It is therefore possible that sleeping quarters should be cooled to a somewhat lower temperature than living quarters.

On the three tests, Nos. 22-34 to 24-34 inclusive, for which the average indoor temperature was above 81° F., the maximum temperatures attained during the day were 84.5, 85.2, and 86.0° F. During these times the house was distinctly uncomfortable to the occupants.

On coming in from outdoors an observer would be satisfied for a short time owing to the contrast, particularly if the outdoor temperature was approximately 100° F. This effect was not lasting, however, and indoor temperatures as high as 85° F. do not seem desirable unless relative humidities lower than those obtained at the Research Residence are readily attainable.

Table 2 gives a summary of total quantities obtained for the season of 1934. The total of 2,675.5 degree hours above 85° F., Item 3, indicates that this season was severe as compared with those for 1933 and 1932, for which the degree hours above 85° F. were 2,309.3 and 1,470.7 respectively. This was caused by the comparatively large number of days on which the outdoor temperature rose above 90° F. The hours above 85° F. for the seasons of 1934, 1933, and 1932 were 481.5, 493.2, and 329.1 respectively, while those above 90° F. were 224.1, 208.4, and 121.8.

It is of interest to note that the total heat absorbed during the season with the two methods of operating the residence from June 20 to Sept. 16 was 8,354,881 B.t.u., which was equivalent to an ice meltage of 29.0 tons.

It is not usual to reject the water to the drain at a temperature of 32° F. in the case of an ice plant. On the assumption that the water is rejected at approximately 40° F. and that advantage is taken of this additional cooling effect, an equivalent ice meltage of 27.5 tons would be obtained as shown by Item 21.

This equivalent tonnage would have been slightly increased if the plant had been in operation about May 15. However, the few hot days in the latter part of May and the early part of June were accompanied by cool nights, and by employing night cooling with outdoor air, it would not have been necessary to start the plant during this time with the exception of not more than five days. The 27.5 tons may, therefore, be regarded as representative of the whole season's requirements under the existing conditions of operation.

### Not Comparable with Ice Tests

This figure is not comparable with the 43.3 tons of ice actually used during the summer of 1932. For the 1932 season the windows remained closed during the whole period from June 1 to Oct. 1, and no advantage was taken of the possible supplementary cooling with outdoor air at night. Furthermore, for one-half of the season no awnings were used on the windows.

For the work in 1934, full advantage was taken of cooling with outdoor air at night for a large part of the season and the residence was equipped with awnings during the whole season. The 27.5 tons is to a certain extent comparable to the estimated 19 tons for the season of 1933 obtained under conditions of night cooling with the fan in the forced-air heating system and windows on both stories opened; if it is recognized that the season of 1934 was more severe

than that of 1933, that the maximum amount of ice used per day was limited to 700 lbs. during the season of 1933, and that night cooling with the windows opened on both stories during the season of 1933 was somewhat more effective than similar night cooling with second story windows only opened during the season of 1934.

A discussion of comparative costs is not conclusive unless unavoidable differences in existing conditions are fully recognized. However, the total cost for electricity and water for the season's operation under local conditions, is of some interest.

### Total Electrical Input

The total electrical input to the compressor and fan, including the input to the fan during night cooling, as shown by Item 17, was 1411.4 kwh. Therefore at the local rate of 0.031 per kwh. the cost for electrical current was \$43.75. The total amount of water used, as shown by Item 18, was 25,741 gal. At the local rate of \$0.37 per thousand gallons the total cost for water was \$9.52.

Hence, the total cost for electricity and water under the conditions of operation was \$53.27. As previously mentioned, if the cooling plant had been operated from May 15 to Sept. 16 instead of from June 20 to Sept. 16, this figure would have to be slightly increased.

However, the season would not have been increased by more than five days on which cooling was necessary and the plant would have had to operate during only a small portion of each day. On the other hand, if supplementary cooling with outdoor air had been used during the whole season a reduction in this cost would have been probable. Therefore, it seems reasonable to regard \$60.00 as the approximate cost for electricity and water for the season of 1934.

### Conclusions

The following conclusions may be drawn as applying to the Research Residence and the conditions under which the tests were conducted:

(1) An indoor temperature of approximately 80° F. with relative humidity below 55 per cent results in satisfactory comfort conditions in the living quarters of a residence. For complete comfort in sleeping quarters a somewhat lower temperature is desirable.

(2) The introduction of approximately one air change per hour of outdoor air for the purpose of ventilation is sufficient to prevent objectionable odors.

(3) A mechanical refrigeration unit capable of producing 2½ tons of refrigeration is sufficient to maintain conditions of comfort on two stories of a residence similar to the Research Residence when the outdoor temperature does not exceed 103° F., and an amount of outdoor air equivalent to one air change per hour is used for the purpose of ventilation.

(4) The use of the fan in the forced-air heating system to circulate outdoor air at night amounting to 9.5 air changes per hour is not as effective in cooling the residence as a whole when the second story windows only are opened as it is when windows on both stories are opened.

(5) The cooling load during the daytime can be reduced by supplementing artificial cooling during the day with cooling by means of outdoor air circulated at night.

(6) Satisfactory cooling with outdoor air at night probably cannot be accomplished by employing less than 9 air changes per hour. The gain arising from the use of more than 30 air changes per hour is very small.

## Proposed N.Y. License On Service Men Studied

NEW YORK CITY—A proposed New York City code for licensing companies, corporations, individuals, or concerns who are in the refrigeration service business, was read by J. G. Riordan, president of Master Refrigeration Association, Inc., at an open meeting held by that organization at the Park Crescent hotel here recently.

Members of the legislative committee who compiled the code are: E. S. Lape, Kulair Corp.; E. A. Wenk, Automatic Refrigeration Service Co.; T. W. Binder, T. W. Binder Co.; E. O. Smith, Smith Ice Machine Co.; Samuel B. Dunne, S. B. Dunne Co.; and C. E. Colyer.

Members of the association and guests at the meeting numbered 128. For the information of the guests, articles of the constitution of the association were read, emphasizing the constitutional objects and those eligible for membership in the organization.

Speakers included R. M. Nelson, manager of general group accounts of the McGraw-Hill Publishing Co.; Glad Henderson, editor of *Radio & Electrical Journal*; and K. C. Brandt, Melchior, Armstrong, Dessau Co., Inc.

## Belsey Air Conditions New Display Room

LOS ANGELES—The George Belsey Co., General Electric distributor for Los Angeles, has centralized general offices, commercial air conditioning, kitchen planning, salesmen's institute, G-E Contracts Corp., and a large display room in the building here that comprises its new headquarters.

The building is air conditioned with the air-conditioning plant located on the display floor. A G-E kitchen is located at the back of the display floor—visible from the street and creating a background for the appliance display.

Sales promotional activities are carried on at headquarters. Sales meetings are held each morning. Bess Meals holds sales demonstrations twice weekly in the model kitchen.

## Denver Furniture Firm To Be Crosley Dealer

DENVER—Waverly N. Miller, manager of the Central Supply Co., Crosley distributor for Denver, recently announced the appointment of the American Furniture Co. as dealer for Crosley electric refrigerators and radios.

**MCCORD**  
*Refrigeration*  
**PRODUCTS**

COMMERCIAL EVAPORATORS  
DOMESTIC EVAPORATORS  
CONDENSERS  
METFLEX ICE TRAYS  
SPIRAL FINNED TUBING  
SPIRAL COPPER FINNED IRON,  
STEEL OR COPPER PIPE  
MCCORD RADIATOR  
& MFG. CO. DETROIT

**CURTIS OFFERS**

- Fair Policy—  
81 Years' Successful Merchandising
- Quality Workmanship—  
41 Years' Building Compressors
- A Complete Line—  
56 Units 1/6 to 15 H. P.
- Financial Stability—  
Highest Capital and Credit Rating  
Dun and Bradstreet—AaA1
- Proven Design—  
13 Years' Building Refrigeration Units

Only by building permanently on this complete combination can you expect sure profits in this fast-growing industry.

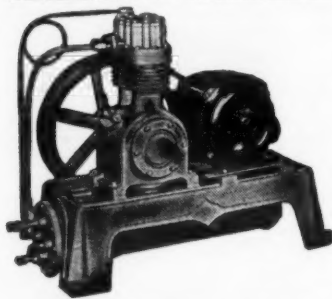
• Some desirable territories are still open for reliable distributors.  
Write for details.

**CURTIS**  
CURTIS REFRIGERATION MACHINE CO.  
Division of Curtis Manufacturing Company  
1912 Kienlen Avenue, Saint Louis, Missouri

## BUYER'S GUIDE

MANUFACTURERS SPECIALIZING IN SERVICE  
TO THE REFRIGERATION INDUSTRY

SPECIAL ADVERTISING RATE (this column only)—\$12.00 per space.  
Payment is required monthly in advance to obtain this special low rate.  
Minimum Contract for this column—13 insertions in consecutive issues.



### STARR FREEZE OUTSTANDING PERFORMANCE attested by satisfied users — EVERYWHERE!

Sturdy Condensing Units from 80 to 2868 Lbs. I.M.E., and all other commercial refrigeration equipment—Wall type cases with machinery—A beautiful household line of modern, conservative styles—Write for full data.

#### THE STARR COMPANY

Richmond, Indiana (factory) Since 1927  
Cable "Starr" U. S. A.  
1344 S. Flower St., Los Angeles, Calif.

### RANCO THERMOSTAT

The Stainless Steel RANCO KRS fills the replacement needs of practically every household refrigerator, water cooler and ice cream cabinet.

For complete information write for Service Bulletin 628

THE AUTOMATIC RECLOSING CIRCUIT BREAKER COMPANY  
1300-10 Indianola Avenue, Columbus, Ohio

## SHAFTS

... Crank and Eccentric  
for Compressors,  
made to YOUR  
Specifications.  
Manufacturers—  
Send Blue Prints  
for Quotations.

MODERN MACHINE WORKS, INC.  
Specializing in the Manufacture of SHAFTS  
2207 Kirkwood Ave. Cudahy, Wisconsin

### A convenient way to keep your back issues of the News

We offer a binder designed and made especially for keeping your file copies of Electric Refrigeration News neat and always available for ready reference. It is made of stiff board covers, attractively bound in good quality of black imitation leather. The name Electric Refrigeration News is stamped in gold on the front cover and back cover.  
The price is \$3.75 shipped to you post paid in the United States and Possessions and Pan-American Postal Union countries. For all Foreign countries, postage based on the shipping weight of 6 pounds must be added to this price. Send your remittance with order. May we send you one?

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.



### CONDENSING UNITS AND COMPRESSORS FOR HOUSEHOLD REFRIGERATION BY

JOMOCO, INC.

A SUBSIDIARY OF THE  
JOHNSON MOTOR CO.  
Waukegan, Ill.  
CABLE ADDRESS: JOMOCO-WAUKEGAN

### BOUND VOLUMES of ELECTRIC REFRIGERATION NEWS

A limited number of recent volumes are available. Each of the following volumes contains all weekly issues of Electric Refrigeration News issued during a period of four months. Stiff paper board covers.

Vol. 8—Jan. 4 to April 26, 1933. (Serial Nos. 198 to 214.)  
Vol. 9—May 3 to Aug. 30, 1933. (Serial Nos. 215 to 232.)  
Vol. 10—Sept. 6 to Dec. 27, 1933. (Serial Nos. 233 to 249.)  
Vol. 11—Jan. 3 to April 25, 1934. (Serial Nos. 250 to 266.)  
Vol. 12—May 2 to Aug. 29, 1934. (Serial Nos. 267 to 284.)  
Vol. 13—Sept. 5 to Dec. 26, 1934. (Serial Nos. 285 to 301.)

Price \$3.00 per volume, f.o.b. Detroit. Shipment will be made by express collect unless otherwise specified. Please send remittance with order.

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

### What! No X-70 Refrigerator Trucks?

"I'd as soon quit business." That's the opinion of many proud, satisfied owners.

The heavy duty X-70 Refrigerator Truck (shown) fits all cabinets with or without legs, or in the crate. Prevents damage to the cabinet, floor or walls. Only pads touch cabinet. Sturdy all-steel frame. One truck with top casters and handles for tilting and rolling into delivery truck and on stairs. Complete set \$34.50. Ball bearing swivel casters on one end \$5 extra.

The Balance Refrigerator Truck  
Ideal for heavy boxes, crates, stoves and furniture. Padded nose piece has instant, exact adjustment. Price \$25. Write for free circular.

Self-Lifting Piano Truck Co.  
Findlay, Ohio  
Manufacturers of Trucks Since 1901



## PATENTS

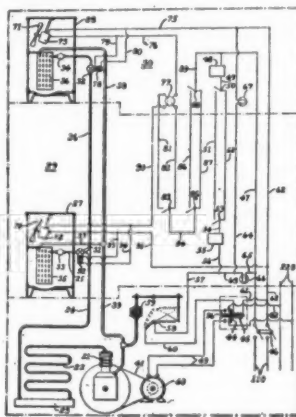
Issued Feb. 12, 1935

1,990,468. VENTILATING UNIT. Charles P. Bridges, Dedham, Mass. Application March 10, 1934. Serial No. 714,988. 4 Claims. (Cl. 257-137.)

3. In a ventilating unit, the combination with a relatively narrow, vertically disposed casing having an air inlet opening in each side of the casing adjacent its bottom, a partition dividing a portion of the interior of the casing into compartments communicating with the openings, respectively, dampers for controlling the flow of air from the compartments, a mixing chamber, a partition below the mixing chamber dividing a portion of the interior of the casing into separate entrances to the mixing chamber, and dampers for controlling respectively the flow of air through the entrances to the mixing chamber, of a radiator supported from the ends of the casing, one side only thereof and the partition.

1,990,471. REFRIGERATING APPARATUS. Don E. Dasher, Dayton, Ohio, assignor to Frigidaire Corp., Dayton, Ohio, a corporation of Delaware. Application Jan. 29, 1932. Serial No. 589,685. Renewed April 10, 1934. 13 Claims. (Cl. 62-6.)

13. An air conditioning system including a conditioner having fan means and air tempering means located in each of a

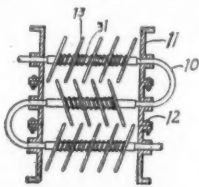


1,990,471

plurality of spaces to be conditioned, separate selective control means at points convenient to each of said spaces to be conditioned, each of said control means being operable to overcome the setting of the other control means to selectively control the operation of any one of the conditioners.

1,990,541. REFRIGERATING APPARATUS. Matthew P. Fugle, Oak Park, Ill., assignor to Larkin Refrigerating Corp., Atlanta, Ga., a corporation of Georgia. Application May 16, 1932. Serial No. 611,460. 5 Claims. (Cl. 257-252.)

1. In a refrigerating plant, a refrigerant pipe having portions thereof in different planes; a plurality of metal heat



1,990,541

absorbing fins removably mounted thereon; and coil springs about said refrigerant pipe between each pair of adjacent fins adapted to hold said fins in spaced apart position.

1,990,663. CONTROL FOR REFRIGERATION SYSTEMS. Glenn Muffly, Detroit, Mich., assignor, by mesne assignments, to Copeland Refrigeration Corporation, Mount Clemens, Mich., a corporation of Michigan. Application March 1, 1929. Serial No. 343,821. 5 Claims. (Cl. 62-4.)

1. In a refrigerating system, in combination, an evaporator, means for supplying refrigerant to said evaporator, a suction line leading from said evaporator, a valve in said suction line for controlling the flow of refrigerant therethrough, and thermally responsive means actuated by a freezing solution contained therein for closing said valve at a predetermined low temperature in said suction line.

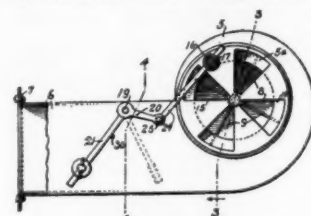
1,990,753. AIR CONDITIONING. Walter E. Rapp, New York, N. Y. Application April 6, 1932. Serial No. 603,673. 15 Claims. (Cl. 257-7.)

1. In a device adapted for the ventilation of a moving chamber, in combination, pressure valve means adapted for automatically introducing a definite quantity of conditioned air into the forward portion of said chamber by means of the movement of said chamber, during both the forward and backward direction of movement of said chamber; and means adapted for automatically withdrawing air from the rearward portion of said chamber by means of the movement of said chamber, during both the forward and backward movement of said chamber.

1,990,778. AUTOMATIC AIR-DRAFT REGULATOR. John A. Dodd, Atlanta, Ga. Application March 21, 1933. Serial No. 661,919. 3 Claims. (Cl. 230-114.)

1. In an automatic draft-regulating device, the combination of a unitary hollow member comprising a fan-casing and an air-duct in immediate open communication with one another, a fan rotor journaled in said fan-casing and operable to force air through said air-duct, said fan-casing having an air-inlet therein, a rotary shutter pivotally connected to said fan-casing in axial alignment with the fan-rotor and operable across said air-inlet for varying the flow of air into the fan-casing

ing through said air-inlet, a rock-shaft journaled in said air-duct and having thereon an air-actuated vane and a weighted arm and shutter-actuating arm, said air-actuated vane being within the



1,990,778

air-duct, said weighted arm being secured to said rock-shaft and disposed substantially horizontally and outside of the air-duct and having a weight mounted for adjusting movement thereon, towards and from the rock-shaft for turning the latter with varying degrees of force, and a link pivotally connected to said rock-shaft and to said shutter for turning the latter towards its closing position, and thereby varying the rate of flow of air through said air-inlet, the said link and rock-shaft and arm and adjustable weight being mutually cooperative for turning said shutter towards its opening position against pressure of the air from said fan-rotor, the said vane having its major air-engaging part remote from said rock-shaft so as to provide an air-passage through the vane and so that the said air-engaging part is located for maximum efficiency with respect to transmitting the force of the air-draft to the rock-shaft and thence to the said shutter, and a rod secured in a wall of said air-duct and extending inward and outward therefrom and located between said weighted arm and shutter-actuated arm in a proper relation to arrest the forward motion of the vane and the rearward motion of the weighted arm.

1,990,846. GAS PURGER FOR REFRIGERATING SYSTEMS. Cecil C. Thompson, Washington, D. C. Application Nov. 10, 1931. Serial No. 574,235. 2 Claims. (Cl. 62-115.)

1. Apparatus for the purpose indicated comprising a duality of tanks of which one is disposed within the other with its walls separated from the wall of the first to define a condensing chamber, each tank being provided on the upper side with an upstanding drum of which that on the inner tank enters that on the outer tank, the walls of the two drums being in spaced relation to continue the condensing chamber into the space between the two drums, an inlet to the condensing chamber at the bottom of the outer tank, a blow-off valve for the condensing chamber at the top of the outer drum, the inner tank being interiorly in communication with the condensing chamber and being exteriorly provided with spaced annular fins constituting baffles and with longitudinal fins on diametrically opposite sides also constituting baffles, the drum of the inner tank being likewise provided with spaced annular fins constituting baffles, and a lead-off pipe for connection to the compressor of a refrigerating system, said lead-off pipe being in communication with the inner tank through the upper end of the drum thereof.

1,990,883. REFRIGERATING APPARATUS. Matson C. Terry, Longmeadow, Mass., assignor to Westinghouse Electric & Mfg. Co., a corporation of Pennsylvania. Application April 17, 1931. Serial No. 530,776. 7 Claims. (Cl. 62-1.)

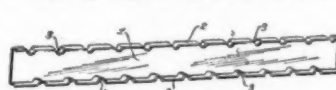
2. In combination, a cooling unit for refrigerating apparatus, shelf supports having upper and lower surfaces pressed in at least two sides of said unit, a heat-absorbing medium contained in said unit, shelves removably mounted on said supports, said shelves comprising a metal sheet provided with edges adapted to engage portions of both the upper and lower surfaces of said supports.

1,990,987. REFRIGERATOR. Chester A. Frick, Muncie, Ind., assignor to Glascock Brothers Mfg. Co., Muncie, Ind., a corporation of Indiana. Application April 2, 1932. Serial No. 602,655. 10 Claims. (Cl. 194-1.)

6. In a device of the character described, the combination with a container, of means within said container for moving each of a series of articles to dispensing position, a coin controlled operating means for said moving means including an operating lever, a stop member adapted to be projected into the path of said lever to prevent the operation thereof and means moving with said article moving means for projecting said stop member in the path of said lever when the article moving means arrives at a predetermined position.

1,991,176. COOLING UNIT. Donald E. Rutishauser, St. Louis, Mo. Application April 1, 1933. Serial No. 663,889. 5 Claims. (Cl. 257-255.)

1. A refrigerator cooling unit comprising a pipe coil adapted for the circulation of a cooling agent therein, and a sec-



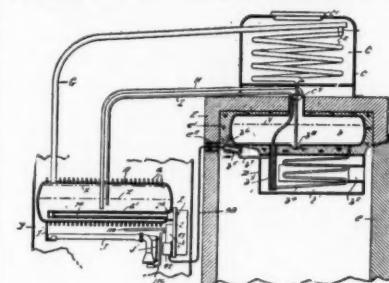
1,991,176

tionally formed heat absorbing plate, certain sections being adapted to be interposed between the convolutions of said coil, the sections of said plate having flanges formed along the longitudinal edges thereof, said flanges being provided with notches so formed and positioned as to register with the portions of pipe of said coil, whereby an intimate heat conductive contact between said plate and said coil is obtained.

1,991,271. AUTOMATIC CONTROL FOR INTERMITTENT ABSORPTION REFRIGERATION APPARATUS. Lee S. Chadwick, Shaker Heights Village, Marc Resek, Cleveland Heights, and Wilbur G. Midnight, Cleveland, Ohio, assignors to Perfection Stove Co., Cleveland, Ohio, a corporation of Ohio. Application Feb. 6, 1931. Serial No. 513,926. 15 Claims. (Cl. 62-5.)

4. In combination with the generator, cooling unit and refrigeration space of

intermittent absorption refrigeration apparatus; heating means for the generator, a thermostat subjected to the temperature of the generator for rendering the heating means ineffective when said temperature attains a predetermined high value, and a second thermostat in heat exchanging relation to the refrigeration space and



1,991,271

adapted to be shielded therefrom by liquid refrigerant in the cooling unit and active under the influence of a temperature value above a desired refrigerating temperature in rendering the heating means effective whereby the apparatus is caused to operate entirely automatically.

1,991,339. HEAT EXCHANGE APPARATUS. Herbert G. Ullman, Scarsdale, N. Y., assignor to American Radiator Co., New York, N. Y., a corporation of New Jersey. Application June 29, 1932. Serial No. 619,840. 7 Claims. (Cl. 257-137.)

2. An apparatus of the character described, comprising a supporting frame, upper and lower spaced headers rigidly secured to said frame, heat exchange tubes interconnecting said headers, conduits connected to said headers for passing a heat exchange medium through said tubes, posts rigid with said frame and extending rearwardly therefrom, a motor and motor shaft, a plurality of leaf springs, each of said springs having one of its ends secured to one of said posts and having its other end pivotally secured to said motor, said springs being bowed in a plane normal to the axis of rotation of said shaft, and a fan driven by said motor shaft for forcing air between and over said tubes.

### 200 Michigan Dealers For Kelvinator Meet

DETROIT — Approximately 200 Michigan Kelvinator distributors and dealers heard the corporation's final plans for the 1935 sales offensive at a meeting last Friday held in the Kelvin Kitchen auditorium at the company's Detroit plant.

J. A. Harlan, commercial sales manager, who was in charge of the morning half of the meeting, devoted part of his time to a discussion of Kelvinator's plans for obtaining a large share of air-conditioning sales this year. Kelvinator, he said, is launching an extensive educational program within its own organization in order to have men in all sections of the country who are properly equipped to supervise all air conditioning sales and installation work.

Expanded advertising plans and the greatest sales promotion campaign in the company's entire 21 years of existence will mark Kelvinator's 1935 sales effort, according to R. I. Petrie, Kelvinator Corp. sales manager, who conducted the afternoon session.

Officials of the Detroit sales branch were host at a special entertainment for their own dealers and salesmen held Friday night at the Detroit Leland hotel. More than 300 attended this party, given under direction of R. W. Walsh, sales manager of the Detroit branch.

### G-E 'Liftop' Considered Lucky in Brazil

RIO DE JANEIRO — Empresas Electricas Brasileiras, a subsidiary of the American & Foreign Power Co., has introduced the General Electric "Liftop" refrigerator to Brazil through a series of eight regional meetings at Recife, Bahia, Victoria, Belo Horizonte, Niteroy, Campinas, Porto Alegre, and Curitiba.

W. H. Taylor of Lojas General Electric, says the LK-1 is known as the "Mascote," which means a good luck piece in Brazilian Portuguese.

### Survey Used as Basis For Electrolux Drive

BROOKLYN — An appliance survey made last year by the Brooklyn Union Gas Co. will be used in its gas refrigeration program this year.

The survey was conducted in 274,947 houses to locate refrigerator and water heater prospects. By means of the survey, for example, each salesman can obtain the names of all one and two-family house residents in his territory who have ice boxes or electric refrigerators.

Before any mailing piece is sent to the customer and before the salesman calls, the customers who do not own gas refrigeration are known.

### Rempe Issues Catalog on Fin Coil Products

CHICAGO — The Rempe Fin Coil Co. of this city has recently issued a four-page circular describing its line of steel, aluminum, and copper fin coils. The circular includes complete illustrations of all products.

There  
cially  
erator  
appli  
you. S  
your r

THE I

The wo

RA  
K  
K  
C

The follo  
United S  
orders ar  
mailed to

1 subscri  
5 or mor  
10 or mor  
20 or mor  
50 or mor  
75 or mor  
100 or mor

1 subscri  
5 or mor  
10 or mor  
20 or mor  
50 or mor  
75 or mor  
100 or mor

1 subscri  
5 or mor  
10 or mor  
20 or mor  
50 or mor  
75 or mor  
100 or mor

1 subscri  
5 or mor  
10 or mor  
20 or mor  
50 or mor  
75 or mor  
100 or mor

1 subscri  
5 or mor  
10 or mor  
20 or mor  
50 or mor  
75 or mor  
100 or mor

1 subscri  
5 or mor  
10 or mor  
20 or mor  
50 or mor  
75 or mor  
100 or mor

Business  
5229 Cass  
Enter  
Send  
Enclos

Name  
Attention  
In Care o

Street Ad  
We sell th

## BUYER'S GUIDE

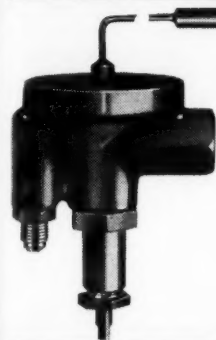
MANUFACTURERS SPECIALIZING IN SERVICE

TO THE REFRIGERATION INDUSTRY

SPECIAL ADVERTISING RATE (this column only)—\$12.00 per space.

Payment is required monthly in advance to obtain this special low rate.

Minimum Contract for this column—13 insertions in consecutive issues.



### PEERLESS THERMAL EXPANSION VALVES

for Methyl Chloride & Sulphur Dioxide

1. No bellows to leak.
2. No possibility of moisture condensation interfering with valve action.
3. Tried & proven in every section of the country.
4. Competitively priced.

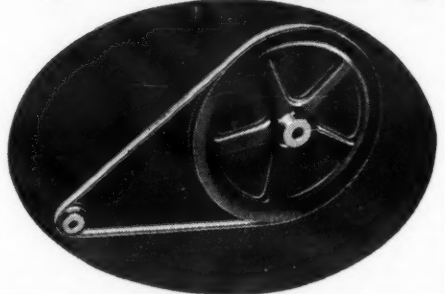
**PEERLESS ICE MACHINE CO.**  
CHICAGO TWO FACTORIES NEW YORK  
515 W. 35th St. 43-00 36th St., L.I.C.

## DAYTON V-BELTS

There is a Dayton V-Belt made especially for all makes and types of refrigerators, washing machines and other appliances. A stock is available near you. Send for price list and name of your nearest distributor.

**THE DAYTON RUBBER MFG. CO.**  
DAYTON, OHIO

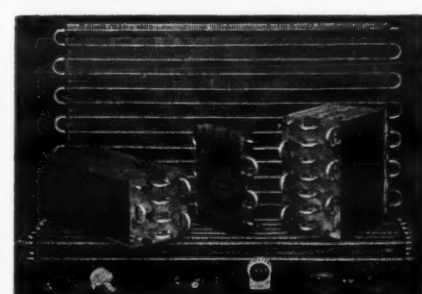
The world's largest manufacturer of V-Belts



### THE TRADEMARK OF FOUR PACE SETTERS IN COIL EFFICIENCY

**SUR-E-FEX** Fin Coils  
**FAN-E-FEX** Diffusing Units  
**HUM-E-FEX** Non-Dehydrating Coils  
**AIR-E-FEX** Air-Conditioning Units

SEND FOR NEW CATALOG DESCRIBING  
THESE SENSATIONAL DEVELOPMENTS  
**REFRIGERATION APPLIANCES, INC.**  
H. J. KRACKOWIZER, Pres.  
1342 WEST LAKE ST., CHICAGO



### Rempe "FIN COIL" Co. Steel-Copper-Aluminum

State Distributors Wanted—Liberal Discounts

340 N. Sacramento Blvd.  
Chicago, Illinois Kedzie 0483

Pipe Coils and Bends; Iron—Send for catalog, price  
Steel—Seamless—Copper Tubing list and sample

Methyl Chloride, Freon, Sulphur Dioxide and Ammonia

### Group Subscription Rates

The following special rates are for PAID-IN-ADVANCE subscriptions only in the United States and Possessions and Pan-American Postal Union Countries. Charge orders are billed at the single-subscription rate, regardless of number. Papers will be mailed to individual addresses.

	Electric Refrigeration News (weekly)	1935 Refrigeration Directory and Market Data Book (2 volumes)	Both Electric Refrigeration News and Refrigeration Directory
1 subscription	\$3.00	\$5.00	\$8.00
5 or more each	2.75	4.50	7.50
10 or more each	2.50	4.00	7.00
20 or more each	2.25	3.50	6.50
50 or more each	2.00	3.00	6.00
75 or more each	1.75	2.50	5.25
100 or more each	1.50	2.00	4.50

For All Other Countries (Except Canada)		
1 subscription	\$5.00	\$9.00
5 or more each	4.75	8.50
10 or more each	4.50	8.00
20 or more each	4.25	7.50
50 or more each	4.00	7.00

Canadian Rates (including tariff of 5 cents per copy on the News)		
1 subscription	\$6.00	\$11.00*
5 or more each	5.75	10.50*
10 or more each	5.50	10.00*
20 or more each	5.25	9.50*
50 or more each	5.00	9.00*

\*Canadian subscribers are required to pay a tariff and excise tax on the Directory and Market Data Book which amounts to \$2.59. These extra charges on books will be collected by the Canadian postoffice at the time of delivery.

### Subscription Order

Business News Publishing Co.  
5229 Cass Ave., Detroit, Mich. Date.....

- ☐ Enter my subscription to Electric Refrigeration News for one year (52 issues).  
☐ Send the 1935 Refrigeration Directory and Market Data Book (2 volumes).  
☐ Enclosed find remittance. (See rates above.)

Name .....

Attention of In Care of .....

Street Address ..... City and State.....

We sell the .....refrigerator and .....

(Please indicate other products or principal line of business.)

2-27-35.

## QUESTIONS

### Sales by Manufacturers

No. 2087 (Manufacturer, Connecticut)—"I have been referred to you as being the most authoritative source of information in regard to refrigerator sales."

"I would like to know the approximate number of domestic electric refrigerators sold by each of the leading manufacturers, such as, General Electric, Westinghouse, Grunow, Kelvinator, Electrolux, Stewart-Warner, Frigidaire, Norge, etc., or, if not the exact number, perhaps you could give me a percentage of total sales for each concern. If this information is not available for 1934, the figures for 1933 will be very acceptable."

Answer: We cannot give you sales of household electric refrigerators by individual manufacturers, or the percentage of the total sales which the individual manufacturers make. This information has never been made public.

### Replacement Parts

No. 2088 (Service company, New York)—"Kindly inform me as to where I may be able to obtain various parts for refrigerators that do not maintain parts departments, some of these being G-E, Gibson, Buckeye, Norge, etc.?"

Answer: The 1934 REFRIGERATION DIRECTORY AND MARKET DATA BOOK lists manufacturers of replacement parts as follows: compressor parts, page 181; condenser parts, page 187; cooling unit parts, page 202, service parts, page 302. These lists will be revised and brought up to date in the 1935 REFRIGERATION DIRECTORY.

### Sources of Information

No. 2089 (Manufacturer, Wisconsin)—"Will you kindly advise me what publication you have or to which you can refer me for the information covering the two following:

"I would like to know (if the information is available) the estimated or statistical figures of installations of household electric refrigerators for the various companies in the field or for the leaders in that field."

"I would like also to know (if there is available information) as to the characteristics and types of the various elements, such as compressors, condensers, evaporators, etc. of the leading makes. This, I presume, might be considered as the specifications of the different makes."

Answer: We suggest you subscribe for ELECTRIC REFRIGERATION NEWS, the weekly business newspaper of the electric refrigeration industry, and the 1935 REFRIGERATION DIRECTORY, the industry's recognized year book, for information pertaining to the electric refrigeration industry. ELECTRIC REFRIGERATION NEWS reports all activities of refrigeration manufacturers and general industry news, and also devotes considerable attention to the air-conditioning field.

Complete statistics covering household, commercial electric refrigeration for the industry as a whole are also published regularly in the NEWS. However, we have not been able to obtain sales figures for individual companies, as this information is not released publicly.

Concerning specifications, complete detailed specifications covering all models of all major makes of household electric refrigerators are published in ELECTRIC REFRIGERATION NEWS. Specifications of commercial condensing units are also published. Within the last year, we have collected specifications covering air-conditioning equipment. The work of collecting specification material for the current year is now in progress and the revised material will be published in future issues of ELECTRIC REFRIGERATION NEWS.

### Kerosene Units

No. 2090 (Dealer, Virginia)—"We are located in a small town, surrounded by a number of other small towns, and large rural agricultural section, this rural section does not have conveniences of electricity. We are looking for a dependable refrigerator operated by burning kerosene, a refrigerator that we can place in the farm homes in this rural section. Can you put us in touch with a source of supply?"

Answer: See below.

No. 2091 (Dealer, Alabama)—"Would you please give us a list of manufacturers making an oil refrigerator and addresses?"

Answer: Kerosene-operated household refrigerators are manufactured by the following companies:

Electrolux Refrigerator Sales, Inc. Evansville, Ind.  
Gibson Electric Refrigerator Corp. Greenville, Mich.  
Perfection Stove Co. 7609 Platt Ave., Cleveland, Ohio.

Another absorption-type refrigerator is the Ice-Ball, made by Crosley

Radio Corp., Arlington St., Cincinnati, Ohio. Waukesha Motor Co. of Waukesha, Wis., manufactures a refrigerator powered by a gasoline engine.

### Pentane System

No. 2092 (Manufacturer, New Jersey)—"Will you please put us in touch with the manufacturers or developers of the Pentane system of air conditioning. This system was explained in the Oct. 3, 1934, issue of your paper but unfortunately our copy has been mislaid."

Answer: The Pentane system of refrigeration is manufactured by McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit, Mich. This system was originally developed by engineers of the Shell Oil Co., and the oil firm later licensed McCord to manufacture the system.

### Sales by Cities

No. 2093 (Advertising agency, Pennsylvania)—"In my 1934 issue of REFRIGERATION DIRECTORY I note that on page 480 there is shown the estimated total sales in each of the individual states."

"I am just wondering if you have similar data for the leading cities, such as New York City, Chicago, Philadelphia, etc., for the last two or three years?"

Answer: We have no data which gives sales figures for individual large cities. Sales by states for 1934 and past years will be published in the 1935 REFRIGERATION DIRECTORY AND MARKET DATA BOOK.

### Exports by Countries

No. 2094 (Distributor, Belgium)—"In making a list of our publications, we note that we lack the June 30 issue of your paper. Would you be able to send us all figures of the Nema statistics, relative to American exports in Belgium and France for the month of April, 1934, of automatic household and commercial refrigerating appliances?"

Answer: As exports of refrigeration equipment are not shown by countries in the Nema reports, we believe that you must have reference to the monthly export bulletins compiled by the United States Department of Commerce which are published regularly in ELECTRIC REFRIGERATION NEWS.

### Meter Sales

No. 2095 (Dealer, Washington)—"Will you please advise us what proportion of electric refrigerators are sold with the meter, out of the total sales of electric refrigerators?"

"Will you also advise us, if you have the information at hand, what the sales, or the quota set for the city of Seattle on electric refrigeration has been, and how near its quota the state has come?"

Answer: Unfortunately, we do not have information which would enable us to determine what the proportion of total electric refrigeration sales are made on the coin-meter plan.

We do not attempt to set quotas for various large cities in the United States or for the states themselves. From our records, we would estimate that approximately 16,000 household electric refrigerators were sold to dealers and distributors in the state of Washington during the year 1934.

### List of Dealers

No. 2096 (Distributor, Pennsylvania)—"The Addressograph Co. has referred us to you regarding an inquiry made to them requesting a list of electrical appliance dealers in the district embracing Pennsylvania, Ohio, and West Virginia."

"Will you be kind enough to supply us with this information?"

Answer: There is no published list of electrical appliance dealers. All of the leading electric refrigeration manufacturers have furnished these names to us for subscription promotion purposes, but with the distinct understanding that the list would not be sold or made available to others.

The only way which we know of to get a correct list is direct from the manufacturers.

### Cofield Washer

No. 2097 (Dealer, Virginia)—"Will you please advise who makes the Cofield Electric Washer and where they are located, if they are still in business?"

Answer: The Cofield washing machine was manufactured by the Cofield Washer Co., Miami Chapel Rd., Dayton, Ohio. According to the most recent information which we have, this company is now out of business.

### Reader Offers Data on Bryant Clock, Ranco Control

"In your issue of Jan. 30 in reply to question No. 2044 (What is the solution used in the Ranco type 'RA' switch bellows) we feel you are in error and as we value this 'column' for the many kinks we have gleaned from it from time to time we desire to set you right."

"The solution used in recent years is CH<sub>3</sub>Cl (methyl chloride) although

## CLASSIFIED

RATES: Fifty words or less, one insertion \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

### POSITIONS AVAILABLE

MANUFACTURER has opening for experienced commercial refrigeration man to handle correspondence pertaining to equipment application. Must have experience in estimating both loads and costs, some actual installation work, retail sales as well as wholesale. Engineering training would be helpful. Give detailed information in reply. Our organization familiar with this inquiry. Box 681, Electric Refrigeration News.

### POSITIONS WANTED

SALES PROMOTION or Assistant Advertising Manager, 35, for refrigerator-radio manufacturer. Radio, all phases since 1915; ten years successful specialty dealer refrigerators, washers, radio, oil burners. Three years department store and wholesale experience. Thorough knowledge advertising, merchandising distribution. Creative planning type. Would serve as field representative or district manager. Box 680, Electric Refrigeration News.

REFRIGERATION Technician with the best mechanical ability and a graduate of Utilities Engineering Institute of Chicago, desires permanent position with manufacturer or service organization. Also experienced in shop servicing of washing machines and vacuum cleaners. Box 679, Electric Refrigeration News.

### EQUIPMENT WANTED

WANTED—Discarded or non-operating Hermetically sealed Majestic Units for cash. Or will replace such units with repaired units at lowest prices. Write full details of what you have. Carl John Stein Co., 122 W. Illinois St., Chicago.

### EQUIPMENT FOR SALE

APPROXIMATELY 300 four-blade Iroquois Rotary Compressors, completely assembled, tested and run-in. Complete with fly-wheel. Also 300 motor pulleys, satisfactory for use with ethyl chloride. Buffalo House Wrecking and Salvage Co., 479 Walden Ave., Buffalo, N. Y.

A WELL-ESTABLISHED independent refrigeration sales and service corporation, with completely equipped showroom and shop for rebuilding, situated in the metropolitan area of New York City, 4 1/2 years in the same location, for sale with complete stock of parts and units. Box 677, Electric Refrigeration News.

### SCHOOLS

MEN: Train for Refrigeration and Air Conditioning, at home, using same text material you would use in best resident school. Supervised individual instruction under licensed teacher with Doctor's degree. Shoeck School, Alton, Ill.

### PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

### REPAIRS

HALELECTRIC thermostat repair service. B & B, G.E., Cutler-Hammer, Penn. Ranco, Tag, etc. Expansion valves repaired. Gas service, Ethyl, Methyl, Iso-Butane, Sulphur. Your cylinder or ours. Competitive prices. Halelectric Laboratory, 1793 Lakeview Road, Cleveland, Ohio.

we understand that SO<sub>2</sub> has also been used.

"In your issue of Feb. 13, you failed to answer query No. 2061. It is possible you did not know the answer, if so, here goes.

"These clocks were made by the Bryant Electric Co. of Chicago. They are set to disconnect the refrigerator at 3 a. m. and bring it on again at 7 a. m., can be used independently of the refrigerator as a clock only and retail here for \$4.95.—E. A. Plesskott, Service Electric Co., 2145 67th St., St. Louis."

### More 'Dope' on Bryant

"Your letter of Jan. 30 addressed to us at Bridgeport, Conn., in regard to our Defrost-O-Clock has been forwarded to us for attention because all of our trade in Michigan is served from this point.

"While we appreciate very much your inquiry we are sorry to state that while at one time we did manufacture and sell the Bryant Defrost-O-Clock, this was discontinued quite some time ago and at this time we are not in a position to supply this merchandise; therefore, cannot give you the detailed information asked for.

"We are not sure just where you can secure a clock of this character at the present time, but would suggest you try the Westinghouse-New Haven Clock Co., New Haven, Conn., or the Sparks-Withington Co. of Jackson, Mich. It may be possible they will be able to take care of your wants."—J. R. Topping, Office Manager, Bryant Electric Co., 844 W. Adams St., Chicago.